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"Progress in public health depends upon an intelligent understanding and leadership among the population whose health is being furthered or protected. A professional background need be only incidental to this understanding and this capacity for leadership but the ability to comprehend and the power to *think* about health problems is fundamental to it. The preparation of our students for community leadership as citizens is probably as significant as their training as professionals."—President Edward C. Reif.

Volume XVIII January, 1954 Number 1

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Recruitment for Pharmacy

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Colleges cannot exist without students. This obvious statement applies to colleges of pharmacy, as to all other professional ones. Its application may be more evident for our few remaining independent colleges, but it applies also to the many subsidized ones that are parts of state or of other universities. Defunct American colleges of pharmacy include many institutions once parts of universities, as well as former independent colleges. Declining enrollments have been major factors in decisions to discontinue the university-type colleges. They have almost always been predominating factors in the cases of independent institutions that have been abandoned.

So every Dean of Pharmacy should naturally be concerned each year about the number of applications and the number of admissions. The extent of this concern varies among the colleges, depending upon the financial strength of the parent institution (where one exists) and upon the extent of institutional support granted pharmacy. But no Dean can afford to say, "I have no concern over the number of entering students".

Assuming a college has staff-members qualified for each of the areas of professional instruction and the basic sciences and non-scientific studies are well cared for, the number of staff-members, the library and the physical plant largely determine the optimal and maximal numbers of students. The minimal number for existence of a college is determined by income from tuition, endowment, university funds and other sources; by policy of the parent institution; by needs of the locality; and by additional factors. Each college undoubtedly

has a theoretical "existence enrollment" which must be met or bettered if the institution is to continue.

Apart from mere numbers is the matter of quality of students admitted to colleges of pharmacy. This consideration has been thoughtfully presented by B. V. Christensen[1] in one of the few articles ever published on recruitment for pharmacy. Dean Christensen discusses the component elements that constitute character and ability and concludes, "we must carefully select only those of our youth who possess the attributes which are deemed essential for this profession". He has directed our attention to a consideration equally or more important than numbers of students, the need for "quality enrollment".

It seems to me we may well classify recruitment programs into the same two general types: "existence recruitment" and "quality recruitment". In the one type emphasis is on numbers, in the other it is on ability and character. Over the years, in pharmacy more effort has been directed toward existence recruitment than toward quality recruitment.

This is not to say that any of our colleges have ignored the ability and character of applicants for admission. Nor does it imply for pharmacy an absence of large numbers of young men and women students of such ability and character as to guarantee success in study for almost any professional field. Every teacher in pharmacy reflects with pride upon the many successful and honorable pharmacists who have sat in his classes.

It is to say that the numbers of students who enter pharmacy colleges from the upper quarter or even half of high school graduating classes is not so great as it should be, or as it could be if pharmacy had a carefully planned and well conducted quality recruitment program. As far as I know, until last year no such program on a statewide basis existed, and today only a few state programs have even been started. None has been completely carried out.

In order to insure an entering class of high quality, we know the element of selection must exist. Where the ratio of applicants to matriculants approaches 1 to 1 there is little

or no selection. On the other hand, a ratio of 2 to 1, 3 to 1, or even 4 to 1 does not of itself insure a superior class of entering students. But a 3 to 1 ratio ordinarily provides a better chance of getting a good class than does a 1 to 1 ratio.

Again the factor of quality must be considered. If a majority of those applying to an institution with a ratio of applicants to matriculants of 2 to 1 were from the top quarter of graduating classes of superior quality high schools, a better class would probably result than as though a 3 to 1 ratio prevailed but most of the applicants were from the lower half of classes from indifferent secondary schools.

During the years of peak enrollments, the late 40's, ratios of 3 to 1, more or less, prevailed for colleges of pharmacy on a nationwide basis[2]. For the past two years ratios of 1.5 to 1, more or less, have existed. A national ratio of 1.5 to 1 is dangerously near the no-selection point when various contributory factors are taken into account (a few large favorable-ratio colleges, duplication of applications, withdrawal of applications, failures to appear after matriculation).

I do not know what constitutes a realistic optimal ratio, but from several years experience during the late 40's at a college with a favorable ratio and with unusually good admission practices, I know that a 3 to 1 or a 4 to 1 ratio does not give sufficient applicants who qualify in every respect under a good admission policy to fill a class. Some students are always admitted with reservations expressed by the admissions committee, and some of these students undoubtedly should be admitted. From this experience, from the survey report of student survival in pharmacy[3], and from study of admission records in many colleges I am led to doubt if any American college of pharmacy has ever had enough applicants of high quality to completely fill an entering class. I realize this is a sweeping generalization, and that certain colleges have accepted and are continuing to accept smaller numbers of matriculants than their staffs and capacities will accommodate and than are needed in their areas. Such colleges do not fill their freshman classes simply because sufficient numbers of well-qualified applicants have not appeared.

Investigations of the Commission on Human Resources and Advanced Training, reported recently in a speech by the Director of the Commission, Dr. Dael Wolfle, are especially pertinent to this situation. Less than one-half of the most intelligent 25 percent of our young people go to college. Among several reasons for this regrettable circumstance is simply lack of data on the nature and on opportunities for the future in various fields of study. Pharmacy can certainly recruit with profit from this large segment of well qualified youth as well as from the many students who "go to college" because it is the thing to do but with no clear concept of the opportunities available to graduates in pharmacy or in any other field.

This again brings us to the need for a program of quality recruitment in pharmacy. Such a program would be a potent factor in insuring continuation of the evolutionary upgrading that has characterized pharmaceutical education in America since before 1900. It would contribute to advancement of the practice of pharmacy along with such other factors as improved educational programs and better prepared teaching personnel.

How should a program of quality recruitment for pharmacy be planned and conducted? Who should instigate the program? What materials are needed for a successful program? No single answer is probably best for these questions when we consider all of our colleges, but an approach can be suggested that will apply to many colleges throughout the country.

A potential student is often encouraged to apply for admission to a pharmacy college by a relative, friend, or employer who is himself in pharmacy. So practicing pharmacists constitute an army of recruitment officials all too often ignored. The revised Code of Ethics of the American Pharmaceutical Association emphasizes the role of the pharmacist in attracting "to his profession youth of good character and intellectual capacity"[4]. But the pharmacist needs to be informed on the aims and ideals of current pharmaceutical education and on the changes the educational program has undergone during recent years.

A second class of people who frequently influence students in their choice of careers is the staffs of secondary schools, from junior high school on. Principals, teachers, and especially guidance personnel are in key positions to inform students about pharmacy. But these people need information on the profession. They themselves need guidance, as emphasized by Dr. Frank H. Bowles[5], Director of the College Entrance Examination Board. Dr. M. L. Neuroth[6] has also offered convincing testimony, if such is needed, that "high school principals and guidance directors were much too unfamiliar with the program of education in pharmacy and the professional activities of a practicing pharmacist".

Dr. Bowles and Dr. Neuroth have emphasized the urgent need for improved communications media for educating those in key positions for quality recruitment, and for informing potential applicants. Simple guidance leaflets, films, slides, and television are among the media recommended.

A guidance booklet, Shall I Study Pharmacy, has been sponsored by the American Association of Colleges of Pharmacy and is available at cost to any college or group interested in recruitment for pharmacy. Responsible guidance officials and many pharmacists have stated that the booklet fills a real need in a reasonably complete fashion. If this is true, then the booklet should be supplied to all guidance personnel and pharmacists in order that it will be available where needed most for quality recruitment of students of pharmacy.

Effective distribution to guidance officers and secondary school administrators is more readily achieved at the state level than nationally. In each state, distribution under the direction of the college or colleges of pharmacy can bring the educational resources in pharmacy of the area to the attention of secondary school personnel in direct and effective fashion. In at least a half dozen states such distribution has already been made, and is being planned in several other states.

Pharmacists have been notified of the availability of the booklet through the pharmaceutical press. Certain manufacturers and wholesalers are also aiding in publicity to pharmacists through their representatives. And in one or two cases

State Associations are sponsoring statewide distribution to practicing pharmacists. But a practical method of getting the booklet in the hands of all pharmacists has not yet been worked out.

Shall I Study Pharmacy is but a start on an effective program of quality recruitment for pharmacy. A comparable booklet for graduate study is needed. A film for instruction of potential undergraduate students would be eagerly welcomed by guidance officers. More modest visual aids have been prepared by two or three colleges and are seeing good use. Additional institutions need to follow these examples. But a first need in many of our colleges is recognition of the importance at all times of a program of quality recruitment.

I have not attempted to introduce a number of closely related topics, such as the number of graduates needed annually in the United States, the economic waste of some of our admission practices, and variations throughout the country in supply and demand of pharmacists. The point is simply that a strong and continuous program of quality recruitment would yield for pharmacy rich returns on the relatively small investment required.

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The Strengths of Pharmacy*

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Praise can be pleasant. Criticism often hurts. Pharmacy and pharmacists have long been subject to praise and to criticism, both in liberal amounts. It is easy to find fault and to condemn. Pharmacy is not perfect,—far from it. Pharmacists aren't paragons of virtue either. We don't find them pictured in stained glass windows, it is true. Neither do we find them in rogues' galleries.

Admittedly, pharmacy and pharmacists have weaknesses and faults, too many of them, both great and small. They distress us. We deplore them. But there is much about pharmacy that is right. If we look, we can find a multitude of things to commend, to rejoice in, to be grateful for.

Continued concentration on pharmacy's defects may blind us to its benefits. So, tonight, let's consider our profession, not in its commercial aspects, but pharmacy at its best, as an indispensable activity in the public health field. Let's examine its soundness, its merits, its excellences,—not its demerits.

We have nothing startling or new to say, perhaps, but we may express our ideas a little differently. Our discusson will be one-sided and incomplete, deliberately so. Someday, someone else in another place may deal with pharmacy's defects—and explain and apologize and defend. This evening, for a few minutes, let's consider some of the Strengths of Pharmacy.

Public and Professional Relationships

Centuries ago, pharmacy was a clandestine art. It had to be. There were things to conceal. Today, there is nothing to hide. We have much to be proud of. Pharmacy is no longer a secret profession, but most people know far too little about it, about the pharmacist, his professional activities, his training, his competence, his ideas, his ideals.

*This is the Remington Medal Address delivered by Dean Muldoon on the occasion of the presentation to him of the Remington Medal in New York City on December 7, 1953 for his distinguished service to pharmaceutical education and practice through many years.—Ed.

With much of our profession the public has no contact. The casual observer is unaware of its extent and its diversity. Many think of the pharmacist only as a business man, not as the conscientious guardian of the health of the people he really is. It is time, I think, to turn the full beam of the spotlight of public attention on pharmacy. We should tell the public more about our profession and about ourselves. A one-day or a one-week program is not enough. It is a years-long task if people are to know well the men in whose hands every day they so confidently trust their lives.

Pharmacists are respected public servants. They should be. They labor competently and diligently to promote and to protect the nation's physical health. It is this valuable service—and this service alone—that justifies the perpetuation, and the continued legal protection, of our profession.

Modern pharmacists perform a front-rank medical work, one that is essential to the well-being of society. They fulfill a great human need. Long centuries of dependable service, based on abundant competence, sound moral character, and demonstrated worth, have earned for pharmacists public trust, and confidence, and good will.

Pharmacy is not an ivory-tower profession. It is now, and it always has been, close to those it serves. Patrons know their pharmacists personally. They rely upon them. They respect their counsel and advice. The pharmacist takes pride in his skill in human relationships. He serves with equal care and courtesy the eminent and the obscure, the aristocrat and the socially disinherited.

He is, of course, a proper source to the public of information on matters dealing with medicines and with general health and hygiene. His patrons consult him, too, on scientific and technical problems, and on personal matters far removed from pharmacy. As a personal, as well as a professional advisor, the pharmacist is a significant, but I am afraid, sometimes undervalued, social force in modern life.

He is an indispensable member of America's great medical service team. Joining with the physician, the surgeon, the dentist, the nurse, and other workers in the health field, he helps to provide an interlocking community service that is the

envy of all the world. The members of the curative professions with whom he works most closely trust the pharmacist and value his judgment, and appreciate the importance of the work he does.

The high regard of his associates in the related professions, and the richly deserved public confidence and good will he enjoys, constitute one of the greatest strengths of modern pharmacy.

Historical Development

American pharmacy is not native. It is derivative. It is derivative historically in that its roots lie embedded in the many foreign countries that contributed to Colonial pharmacy. For centuries, the pharmacy of the Old World was far in advance of that in America, and we drew upon it freely. As this country developed, our pharmaceutical self-reliance steadily increased. We needed less and less help from abroad. Eventually, we achieved complete independence. America became a drug supplier to the whole world. We are aware that we have not yet reached the apex of professional achievement, but we can, if we care to, stand alone. We are beginning to realize increasingly, however, that for their benefit as well as for our own, we should establish and maintain close contacts with the pharmacists of all the free nations of the world.

America is now permanently involved in world affairs. Americans have become world-minded, and rightly so. Other nations look to us for the leadership we are glad to give.

We applaud pharmacy's steadily developing international outlook. We welcome to our schools foreign students and teachers. We interchange the results of our researches. For a number of years we have engaged in international agreements. Our Pharmacopeia is official in countries other than our own. We participated in the production of the *Pharmacopoea Internationalis* of the World Health Organization. Recently, groups of American pharmacists have journeyed to Europe and to Asia and South America, and to the other countries of our own continent. Last year, in Philadelphia, pharmacists from a score of foreign countries participated in

the Centennial Celebration of the American Pharmaceutical Association.

The wheel is coming full turn. In 1753, we were recipients only. In 1953, it is our privilege to give as well as to receive. *We gain strength in the giving.*

Pharmacy, today, is highly developed. But we shall never know when or where or how pharmacy began. Its origin lies veiled in the mists of antiquity. Probably, in the beginning it was a home art. Later, it was practiced in the temple. Written records reveal that the art of the apothecary was surprisingly well developed in ancient Egypt and Assyria. Always linked to medicine, pharmacy advanced in Greece and Rome, and more rapidly during the Arabian period. By the Middle Centuries it had freed itself from a frustrating domination by medicine, and it was able to emerge and eventually to sustain itself as a separate calling.

Through the long centuries, pharmacy has continued to prosper despite the disruptions of war and the vicissitudes of peace. It has survived economic and political and social revolutions. Scientific and technological advances have assisted, rather than impeded, its progress. It continues to advance at a fast pace. Its long life and its sturdy endurance certify to pharmacy's essentiality, and to its fundamental soundness.

Progress in Medicine and Pharmacy

When there was still a simple agrarian society, only plant drugs found any considerable acceptance. Chance or caprice often dictated their use. The rational scientific medicine of today was far in the future. Inorganic chemicals were first introduced, and then, at the turn of the present century, we began to use organic medicinals freely. As chemical medicines demonstrated their value, the use of berries and barks and leaves and roots, and preparations made from them, declined. Botanicals were subordinated but by no means obliterated. The trend away from plant medicines, however, continues.

A half century ago medicine changed its emphasis from cure to prevention. The search for specifics was intensified. During many years, great numbers of synthetic medicinals were tested. Later, we entered a biological era of serums and

antitoxins and vaccines. More recently, came the introduction of the vitamins and hormones, the sulfa-drugs, the antihistaminics, and the enzymes, and the antibiotics. The study of medicinal radioisotopes is now well under way. Our newest concern is geriatric medicine, the developing of methods and materials for treating the degenerative diseases of the aged.

All these changes and advances have been initiated, not by pharmacy, but by medicine. Medicine leads. It always must lead. Diagnosis must precede treatment. But we are proud of how well pharmacy has kept pace, step by step, with its sister profession in all its amazing progress.

New medicinal agents and new methods of treatment demanded of pharmacy new understandings, new adjustments, new procedures and new forms for administering medicines. Pharmacy responded well. We would expect it to, for *one of the strengths of pharmacy is its willingness to face its problems as they arise.*

Pharmacy made the new drugs pleasant and easy to take. It hurried to devise improved tablets and capsules and ampuls and other forms of medication. Just now, the needle is in fashion. More and more drugs are administered by injection, a practice that affects markedly the kind of work now being performed in the prescription room.

It is feasible to carry on only minor sterilizing procedures in the ordinary drug store. Necessarily, then, most injectibles are prepared by the large drug manufacturers. So are the thousands of pills and capsules and tablets, and other types of unit-dose medication that America uses in such stupendous quantities. These require little preparation and handling by the pharmacist. As a result, increasingly he becomes more and more a distributor of medicines, and less and less a compounder. This is the 20th century's most revolutionary change in pharmaceutical practice.

The art of the pharmacist, while still important, becomes less used and less useful. Some of his once admired technical skills begin to show touches of rust. The manual labor of the prescription desk is lightened, but the pharmacist's responsibility in the handling of thousands of medicines, in-

stead of hundreds, is greatly increased. He is now a head worker rather than a hand worker. The time he once employed in the preparation of medicines he now devotes to other professional duties.

Despite such changes and modifications, pharmacy is still the quadrate calling it long has been—art, science, business, and profession. Some 105,000 trained and licensed pharmacists practice their profession in 62,000 drug stores and pharmacies, hospitals, manufacturing plants, research institutes and colleges and universities. They dispense more than 400,000,000 prescriptions annually, and the number increases each year. Some 20,000,000 people a day visit the drug stores of America to seek the pharmacist's advice, to obtain medicines, and to purchase health supplies and the personal needs and conveniences that many pharmacists offer as a community service. The cash register rings up sales of four and three-quarters billions of dollars annually.

To satisfy a very real demand for non-pharmaceuticals, and to increase their incomes as well, many pharmacists have become a kind of hybrid pharmacist-merchant. In their stores business and profession meet. There need be no incompatibility between the two. There is no reason why a conscientious pharmacist shall not also be a competent business man. But the business of pharmacy can be, and sometimes is, overemphasized to the detriment of the professional.

In well conducted professional and semi-professional pharmacies, there is a proper fusion of business and profession, not a dichotomy. In localities where the demand for professional service is small, the commercial subsidizes the professional, and the public benefits. The many thousands of pharmacists who achieve a suitable balance between business and profession are the backbone of pharmacy. *They give our profession great strength.* We are proud of them. Pharmacy is willing to be judged by them as well as by the other strictly professional pharmacists who approach more closely the ideal. Such pharmacists supply nothing but prescription service and sickroom needs. They give dignity and prestige to their calling. They increase steadily in numbers, importance and influence.

Specialists in hospital pharmacy form another group in which we take great pride. These men and women practice their profession in its purest form since in their service the profit motive does not enter.

The Pharmaceutical Industry

At first, the pharmacists who resisted the transfer of medicine-making from the prescription room to the manufacturing plant, viewed the matter as wholly a personal and a pharmaceutical matter. But something more than that was involved. An industrial age, a mechanized civilization was developing. It soon became apparent that in no field could individuals compete effectively and economically against the large manufacturers' prodigal use of non-human energy, their automatic machines, their research organizations, and their specialized labor.

Pharmaceutical manufacturers appeared to have inexhaustible financial resources. They took advantage of every modern medium of communication and transportation to provide good service and rapid delivery. The elegance of the mass-produced medicines, and their economy, could not be denied. The products were of high quality. Pharmacists had to admit that extraordinary care was taken in their manufacture. There could be but one end. Individual and group opposition to the manufacturers abated. Pharmacists adjusted to the new situation.

Any expanding technology tends to depersonalize. Even in selling, machines may displace men. But there can be no robot pharmacies. In the true pharmacy, the professional advice, the professional service, and the professional responsibility of the skilled pharmacist can never be eliminated. The human touch will always be needed. The pharmacists' technical knowledge informs and protects the patient and the physician. The physician needs information concerning the new medicines he prescribes, not only factual information but evaluations and comparisons of the 8,000 prescription products that are now available.

Whether or not he prepares them personally, the pharmacist is responsible for all the products he dispenses. He must have, and he does have, faith in those who make them.

So well have the manufacturers served the pharmacist and the physician, and through them the public, that today no one would even consider a return to the old conditions.

We are proud to list our great pharmaceutical manufacturing industry, vigorous, alert, progressive, as one of the most important strengths of modern pharmacy.

Industry does more than make medicines. Its interests are broad. It looks to the future. It is not surprising, then, that pharmaceutical education has become one of industry's chief concerns. They know that men are the profession's most important resource. The colleges supply new manpower to the profession each year. It is largely through these college-trained men and women that the manufacturers' products eventually reach the sick room. Now, more than ever, the prescriptionist must be well educated for his work. Industry seeks for itself broadly trained and liberally educated men and women. It needs executives, researchers, production men, and other skilled workers. In the future, more frequently than it has in the past, perhaps, industry will utilize the specially trained graduates of our colleges of pharmacy. There will be more of them. They will be better prepared.

The American Foundation for Pharmaceutical Education

The manufacturers assist education individually and directly, but more often in recent years they have operated through the enormously helpful American Foundation for Pharmaceutical Education. *This Foundation is one of the newest and most significant strengths of pharmacy.* Through this organization, manufacturers, wholesalers, and other interested persons and groups have financed projects of inestimable value. They supplied the funds for the recently completed and very costly Pharmaceutical Survey that sought to discover what is right about pharmacy, and what is wrong, and what should be done about it. They continue to subsidize *The American Journal for Pharmaceutical Education,* the American Council on Pharmaceutical Education, and the stimulating annual Conferences for Teachers.

Foundation fellowships and scholarships have made advanced study possible for hundreds of able students who otherwise could not have afforded it. Financial aid has been

granted generously to needy undergraduates. Last year alone, the Foundation's scholarship and fellowship expenditures passed the $100,000.00 mark.

Those who conceived this forward-looking organization, and those who direct and support it deserve, and have, the gratitude and the deep appreciation of the students, the colleges, and of pharmacists everywhere.

Education

Pharmacy is proud of its 74 accredited colleges, and rightly so. *Our educational system is one of our greatest strengths.* Even so, we are not satisfied with it. I hope we never will be.

Once, apprenticeship or internship played an important part in the training of the pharmacist. It no longer does. Pharmaceutical education is almost wholly delegated to the college. Just now, there is a keen and widespread, and I think, rather wholesome dissatisfaction with our schools and their curriculums. The professional competence of our graduates is not questioned; but many educators and practicing pharmacists, and even disinterested observers, point out that the colleges fail to give their students the well-rounded education to which, as members of a profession, they are entitled. Our critics say we graduate men and women of circumscribed interests, narrow specialists prepared only for living in a compartmented world. We are counseled to broaden our training by including more of those branches of learning that are conducive to culture, specifically the humanities.

If our training is to be preparation for all aspects of living, social, economic, and esthetic, as well as professional, we are not doing our job well. We are aware that specialization in any field, begun too early, is ill-advised. We know that pharmaceutical education is now and always has been specialized and utilitarian. Pharmacists are realists. They demand functional education. They are not interested in learning that which they consider to be largely decorative if the professional has to suffer. Their first concern always has been and always should be, the safety of the public.

We know that no one kind of education can serve all the needs of all the people, or even today, all the needs of

all kinds of pharmacists. We believe that our schools in their four-year course are making competent pharmacists for the retail field as we find it today. Even so, few will deny, I think, that we should give more attention to the pharmacist's non-professional learning. His personal life, as well as his professional life, deserves consideration. In college he should complete a well-balanced course of instruction which will include scientific and professional and cultural subjects that will enrich all his living. Such programs have long been offered, but they have not been mandatory.

To liberalize our basic training, we are advised to synthesize the vocational and the intellectual, to fuse our scientific and professional knowledge with more of the social sciences and the older humanistic studies that are commonly administered by the college of arts. Everyone will agree to that, I think, at least in principle. Certainly, we want to graduate men and women of culture. But they must be able and safe pharmacists, too; they must be well grounded in the basic sciences; and they should have at least some knowledge of the fundamentals of business. We want them to be good men, and good women, and good citizens.

Beyond that, we should *like* them to have a knowledge of economics and sociology and psychology and philosophy and a modern language or two. We want them to know something of what happened in the world yesterday and how it affects today. Their taste in music and literature and art should be cultivated. Our graduates should be prepared professionally and intellectually and socially for the important work they are to do, and for the dignified position they are to fill in modern society. We want them to enjoy the full respect of the public and of the allied professions. We want them to look across to the doctor, and not up.

That is an ambitious program. By extending our course of study a single year, we can accomplish only a very small part of it. We are not sure we could achieve all our aims even with much more additional time at our disposal. We do admit, however, that we have carried specialization too far. We do need a broadened curriculum.

But we point out to those who may have a tendency to over-rate the value of an arts college training, that we doubt if even the complete four-year arts curriculum, as it is frequently administered, fits a man much better than does our curriculum for life today in a complex and competitive world that is shaped so largely by science and technology. We do not disparage the arts course. Far from it. We merely point out that the curriculum in pharmacy has unappreciated values.

No one has yet proved that any one group of disciplines is the single and only way of liberating the mind. It is disturbing that so many educators, pharmaceutical and otherwise, in advocating the inclusion of more of the humanistic studies seem to feel that the pharmaceutical curriculum, with its fascinating variety of subject matter, has little or no moral or ethical or cultural value. I recognize no such limitations. The contributions of our curriculum are not wholly physical. Every subject in it, when properly taught, has cultural value.

We learn of the great discoveries in science, of those who made them, and of their effect on society. We learn of the great chemists and physicists and biologists and pharmacists. We even know about Beowulf! We develop the powers of reasoning, as well as understanding and memory. Our students learn to distinguish between facts and judgment. We encourage pride of self and pride of profession, and the development of self-discipline and self-reliance. At the same time we teach cooperation, and personal and group responsibility.

We inculcate sound moral and spiritual and ethical values by discussion and illustration and example. We teach respect for law, and the dignity of work, and the necessity for sincerity and honor and truthfulness in our relations with others. We encourage honesty and industry and accuracy and patience and perseverence. We nourish curiosity and initiative, creative power in thinking, and intellectual courage. We endeavor to develop sound attitudes and insight as well as professional skills. We are concerned not only with what the student learns, but also with the attitudes he develops

as he learns. We try to inspire as well as to teach. In some scholars, at least, we kindle a love of learning.

We need not be too discouraged with the results of our current efforts to educate pharmacists. We know that our graduates still have much to learn. But their college training is only the first and formal part of their life-long continuing education. We believe that our young pharmacists are better fitted than ever before for a satisfying life. But that isn't saying that we are satisfied with our product. It can be improved. We will be among the first to affirm that additional formal instruction will increase the actual and potential value of the pharmacist to society.

Some academically adventurous colleges of pharmacy already have in operation minimum five- and six-year programs. The question of extending the basic training in all college from four to five years is now under active consideration. Judging by the strongly affirmative votes on the question by our great national associations at their 1953 conventions, it is safe to say, I think, that the step will be taken in the not distant future. Many practicing pharmacists favor the change. Many others do not. Both groups offer strong reasons in support of their positions. If we do add a year, pharmacists must not expect immediate and spectacular results. Education is a long and slow and sometimes tedious process. It lacks drama.

The American Council for Pharmaceutical Education

Extent of curriculum, of itself, means little. It is content that is important. Sometimes we seem to measure education only by length, rather than by quality or substance. Our present course of study has not been lengthened since 1932, but everyone interested knows that there have been many significant advances in its administration and in its content. The Charters' Report and The Pharmaceutical Survey stimulated improvement. For many years the powerful American Association of Colleges of Pharmacy, and more recently, the American Council on Pharmaceutical Education, have had enormous influence in promoting the development of our colleges, physically, academically, and professionally. The establishment of the Council was a mile-stone in modern phar-

maceutical education. University administrators and state boards of pharmacy rely upon its judgment and accept its decisions. The studies made by the Council in evaluating our colleges have benefited notably not only the individual college and its parent institution, but all pharmacy. And all pharmacy is grateful.

Seminars for Teachers

In recent years, we have become interested not only in what our teachers teach, but in how well they teach. The seminars for teachers, conducted annually by the American Association of Colleges of Pharmacy under the patronage of the American Foundation for Pharmaceutical Education, are bringing new life and new vigor to pharmaceutical education. Just as we need to reinforce and broaden our curriculum, we need to vitalize our teaching. The quality of our product is influenced by the quality of our student material, and by the competence of our instructors. They should be forceful and imaginative and enthusiastic teachers, creative thinkers, and men and women of high moral and ethical standards. They should develop and maintain student interest and enthusiasm. They should be fully convinced of the value of the work they are doing, and skillful enough to do it well. Pharmacy has had great teachers in the past. Remington was one of them. We have notable and inspiring teachers now. We shall need even more of them in the future. The seminars can help.

Continuation Study

For practicing pharmacists, study should never end. Minds must be refreshed and refurnished. Educators realize more keenly than do pharmacists, I think, that pharmaceutical education must be continuous. Many colleges offer refresher courses and work-shops and seminars to keep pharmacists in service in touch with the latest professional and scientific developments. The pharmacist returns to the college briefly for instruction. Some schools and associations provide itinerant instructors and advisors and offer other valuable extension services. A few college faculties even leave their campuses and go to the pharmacist to make it easy for him to learn the new. Teachers need to keep in touch

with reality. They should know what is actually going on in practice. Close contact with the prescription room is essential. Teachers who participate in continuation education soon discover that teaching a voluntary group of mature pharmacists who are determined to learn, is quite different from instructing the captive audience of the college classroom. In every case the teacher as well as the pharmacist is stimulated.

Specialties in Pharmacy

Not everyone realizes to what extent pharmacy has become a specialized profession. Retail pharmacy, the most important and most familiar specialty, attracts by far the greatest number of our graduates. The major objective of our minimum course must be, therefore, to prepare men well for the retail field. But students with other career interests must be considered. One graduate out of ten enters hospital pharmacy or engages in drug production or sales or promotion; or in wholesaling or organizational work or journalism or government service; or in education or research, or in some other specialty. No one college can be expected to provide instruction in all of pharmacy's branches. But regardless of their individual choices, we serve all our students well when we provide a flexible curriculum with emphasis on a breadth of education, that is in turn based on sound fundamentals.

Graduate Instruction

Each profession is responsible for its own development. To direct pharmacy in the future we shall need well-informed, creative minds, as well as skilled hands. Professional progress comes through research. One of the most important functions of pharmaceutical education is to prepare men for advanced study and systematic investigation. Colleges have an obligation to produce knowledge as well as to transmit it.

More than 600 students are now enrolled in our graduate schools seeking M.S. and Ph.D. degrees. We need many more, for industry and education engage these highly trained workers while their diplomas are still in their hands. Among the 4500 Bachelors of Science in Pharmacy we graduate each year, are scholars of ability and initiative who would if properly trained be able as researchers to make significant contribu-

tions. Those who have the capacity and the desire and the will, should be encouraged to undertake advanced study. Under wise direction they will grow and develop and learn to adventure independently into the unknown, in whatever fields they may choose.

Professional Literature

Eventually, the results of their researches will be published in the technical journals for all to see. Publication is a way of obtaining an unprejudiced evaluation of a man's work by other specialists in the area. Professional journals permit communication among the members of a group. In them, new ideas, new methods, new materials are announced. Often, they are the only means the man in the prescription room uses to supplement his professional knowledge. Pharmacy is fortunate, then, that *its professional literature is one of its developing strengths.*

We take pride in the two *Journals of the American Pharmaceutical Association,* the *Bulletin of the Society of Hospital Pharmacists,* the *American Journal of Pharmaceutical Education,* the *American Professional Pharmacist,* and the most venerable of all, *The American Journal of Pharmacy.* All these compare favorably with the journals of the other medical sciences.

There are dozens of other useful journals published by associations and manufacturers and schools. An even larger number of national and regional journals, such as *Drug Topics,* and *The American Druggist,* and the *Journal of the National Association of Retail Druggists,* are devoted more especially to the news and to the business of pharmacy.

Textbooks, as well as formularies and dispensatories and other reference books, are improving in quality and increasing in number. Publications dealing with the history of pharmacy come from the distinguished American Institute of the History of Pharmacy. Pharmacists have long been active and influential in preparing the many revisions of the *United States Pharmacopoeia* and the *National Formulary.*

Pharmaceutical Organizations

The National Formulary is wholly the work of the American Pharmaceutical Association, our oldest and most eminent,

national, professional organization. *This admired and respected association, together with other societies that subscribe to its ideals, form one of pharmacy's superlative strengths.*

Active, vigorous, expanding, the APhA is an organization of which all pharmacists can boast. For over a century, it has consistently advanced the prestige of pharmacy and extended its usefulness, arousing, encouraging and informing not only its own members, but all other pharmacists who would listen. Unselfishly, it mothered numbers of other national, regional, and state associations. More than half the students enrolled in our colleges today are members of its student branches.

The APhA sets standards of professional conduct and excellence. It represents pharmacy's collective conscience. It gave us our exemplary code of ethics. It deals with members by the thousands, but it is happy to serve personally even the most remote and inconspicuous individual pharmacist. Inclusive, rather than exclusive, the Association welcomes to its ranks all who have a legitimate interest in pharmacy. Under expert leadership its thousands of members pool their wisdoms and experiences and hopes and ideals to determine the Association's policies. Its officers are leaders in national planning and action. The Association speaks authoritatively for the profession when a stand must be taken on controversial questions. As very recent history plainly shows, when it chooses to exert it, the APhA has a powerful influence on national legislation that affects pharmacy. Capitol Hill respects the advice and counsel that come from the APhA headquarters, Washington's stately white-marble American Institute of Pharmacy. Capitol Hill listens to other associations, too, but the mother society can speak ably for all divisions of pharmacy.

There are more than a dozen strong national associations concerned primarily with the economics of pharmacy, with wholesaling and manufacturing and with other special interests. There are even important smaller specialized groups, such as the American College of Apothecaries, among the pharmacists who serve the public directly. In Rho Chi, the

Phi Beta Kappa of pharmacy, we have a large and active society that encourages high scholarship in our colleges. Pharmacy is better organized today than ever before, but we need still greater solidarity.

State Boards and Legislation

Pharmacists have a personal and a group responsibility to see that safe, dependable, up-to-date pharmaceutical service is available to all. The state makes of pharmacists a privileged and protected group. It depends upon them to provide continuously a special kind of indispensable health service that cannot be furnished by others. It must be modern, reliable, accurate, precise. The careful legal regulations that surround and protect the pharmacist are the state's indirect acknowledgment of the importance of the pharmacist's work. *They strengthen pharmacy.*

The many national, state, and local laws and rules and regulations that protect and guide the pharmacist, ensure safe service to the people. Pharmacists have, as they should have, great respect for the law. To a considerable extent pharmacists, through other pharmacists, police their own profession. Offenses against pharmaceutical ethics are the province of the professional societies. But there are laws which must be obeyed. The State boards of pharmacy, composed of experienced pharmacists, influence and guide legislation. They regulate the practice of pharmacy.

They license pharmacists, administer internships, and authorize the operation of drug stores. Under their direction infractions of the pharmacy laws are detected and punished. The boards guard against inefficient prescription compounding and the unauthorized sale of forbidden or restricted drugs. They apply legitimate pressures for the improvement of pharmaceutical practice.

The state boards are linked through the National Association of Boards of Pharmacy, a strong organization that works quietly but effectively for the betterment of pharmacy and the unification of the laws which govern it. Through district and national meetings it fosters a close and friendly relationship with the colleges. This splendidly directed Association

is an invaluable aid in maintaining and extending the influence of pharmacy, and in protecting the public and the pharmacist. *It adds to pharmacy's strength and professional prestige.*

The regulatory work of the boards and the leadership of our associations is sorely needed at this special time when the nation's faith in moral values appears to have weakened, and the restraints that have always governed society seem to have become impotent or inoperative. With less effective colleges and associations and boards, the path ahead would indeed be dark.

The Future

Men are always apprehensive of the future. Just now, more than ever, we have a feeling of insecurity. World affairs cause great unease. We know that ahead of us lie political and social and economic changes. They are inevitable. If they come, as we hope, through the discipline of the law, they will not be catastrophic. Whatever the changes may be, and whenever they come, as sensible Americans and as responsible professional workers, we shall adjust to them. In pharmacy, we may expect frustrations and disappointments and, sometimes, failures. But there will be successes, too. Strength comes through struggle. Pharmacy will continue to have dignity and character and direction and purpose.

In a recent convincing editorial Dr. Robert L. Swain tells us that today the drug store is economically secure, and professionally sound, and competitively strong. We believe it will continue to be secure and sound and strong. We expect it to gain strength through firmer organization of those who practice it, through advanced educational standards, and through the improved understanding that will result from an enlarged public relations program.

Convinced of the soundness and essentiality of their profession, pharmacists will develop new public appreciation and support by telling the story of pharmacy truthfully and enthusiastically and perseveringly to all who will listen. Interprofessional relationships will be clarified and strengthened. International friendships will flourish. Industry will continue to assist the colleges in opening new doors into the future. The pharmaceutical curriculum will be extended be-

yond the five-year plan now under consideration. Graduate offerings will be enlarged and expanded. As the specialties of pharmacy grow in importance and attractiveness, they will receive the greater individual attention they already deserve.

The graduates of our present and projected educational programs will be able to employ effectively the most modern physical and chemical and biological and radiological tools of their profession. They will cope successfully with all the hoped-for progress that scientific research will bring to medical treatment. We are confident, too, that we shall have trained them sufficiently well in general areas that they will be able to maintain a serene inner sense of direction in the midst of confusing social change.

We admit, regretfully, that there will always be men engaged in pharmacy who differ in their choice of values. Many, many thousands, the great majority, will aggressively support their profession, understanding its primary purpose, aware of its past accomplishments, and proud of their own professional activities that promote the common good.

There will be other profit-seeking traders who will flaunt their disloyalty to an ancient calling and scoff at the imperatives of professional ethics. The separateness of the two groups will increase. Since environment can gravely affect the quality of pharmaceutical service, eventually we hope, the privilege of practicing pharmacy in highly commercial surroundings will be withdrawn.

We foresee no changes in the American pattern of life that will negative the pharmacist as a social force. His gracious human qualities will endure. Psychologically as well as pharmaceutically, he will continue to minister to a great fundamental need, and offer wise counsel as well, to the disturbed in mind and to the ill in body, helping both to orient wisely their living.

Pharmacists will always be what the *American Druggist* so aptly termed them—neighborhood statesmen. As patriotic citizens they will continue to enter wholeheartedly into the life of the community, contributing their special skills and wisdom and experience and judgment in the public service. Unselfish-

ly, they will help others to obtain what they themselves seek, health, and independence, and security, and personal freedom, and the right to enjoy the American way of life.

The conscientious young pharmacists of today are rightly concerned about the future. They look ahead. Sturdily independent, they will, we believe, want no share in a paternalistic economy planned from above. They are not unrealistic idealists. They desire only what we are confident they will have—an opportunity to earn in a fear-free democracy a modest living for themselves and their families, practicing worthily the profession for which they have been trained. They have faith in the future. They have faith in pharmacy. They may well have, for pharmacy is strong today. It will continue to be strong.

It will continue to be strong—

Because of the character and motivation of its personnel;

Because of public trust based on age-long, faithful and intelligent service;

Because of its respect for education;

Because of its awareness of its problems and its willingness to face them;

Because of its deep concern for the future.

The American Animal Health Pharmaceutical Association will hold its Fifth Annual Convention and Seminar in Lexington, Kentucky, from April 4 to 7. An excellent program is being prepared. This is the time of year when the beauty of the blue grass country is at its best. A large attendance is anticipated.

The Objectives of Graduate Pharmacology and How to Achieve Them*

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A little more than six years ago, a group of professional pharmacologists from academic institutions, government and industry met at Yale University to discuss graduate education in pharmacology. In part the desire to hold the Conference stemmed from a scarcity of trained pharmacologists, particularly at the doctoral level, in all three agencies. During one of the sessions devoted to discussing possible measures to combat this shortage, it was suggested that Colleges of Pharmacy might develop adequate training facilities for developing pharmacologists. However, it appeared to be the consensus of the Conference members that although some Colleges of Pharmacy should be capable of training personnel for routine work, primarily in the field of bio-assays, they lack several of the essential qualities for turning out top research pharmacologists.

Today, judging from the numerous requests we receive for our graduates, pharmacologists are still in considerable demand. I would surmise, also, that most of the conferees who gathered at Yale University still hold to their earlier views concerning graduate training of pharmacologists in the Colleges of Pharmacy. However, I feel that by now many of my professional colleagues are alerted to the fact that Colleges of Pharmacy are becoming increasingly cognizant of the need for competent pharmacologists and toxicologists and are rising to meet the challenge.

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Traditionally, the training of professional pharmacologists has been under the supervision of medical schools, but there appears to be a trend toward expanding this function to the general university level. There is no valid reason why graduate training in pharmacology should be restricted to a single department, provided that other departments have commensurate standards of instruction and facilities. The frontiers of pharmacology cannot be sharply defined from those of its parent and sister disciplines of physiology, biochemistry, toxicology, and microbiology. Moreover, the applications of pharmacology extend beyond the clinical branches of medicine into veterinary medicine, dentistry, pharmacy, public health, agriculture, academic, forensic and industrial toxicology, sanitation engineering, criminology, and other fields.

It is clear, therefore, that the objectives of graduate training in pharmacology must be comprehensive to cover a wide range of activities in a broad scientific discipline. Graduates should be trained to perform the specific functions and occupations of the profession, but, even more important, they should be exposed to an environment that is conducive towards developing creative and intellectual leaders of the highest integrity and character. Such a program should enable qualified individuals to gain an advanced critical appreciation of the principles, facts and methods of pharmacology and to develop their capacity for enlargement of such knowledge independently. The main objective of graduate training in pharmacology is, then, to develop responsible citizens whose contributions to society will stem largely from their specialized interest and aptitude in the scientific field generally referred to as pharmacology. How can we strive to achieve this goal?

Fulfillment of these broad objectives depends on the student, the faculty, the physical facilities and the program of study. Consequently, the student should be carefully selected on the basis of his character, integrity, interest in research, superior scholarship and adequate background in mathematics, chemistry, physics and the basic biological sciences. However, the general course requirements should

be flexible in order not to discourage students in fields other than medicine from entering graduate studies in pharmacology. Recognizing that pharmacology is a broad discipline, active measures should be undertaken to attract, stimulate, and encourage qualified students with diversified backgrounds. The mathematician, physicist, chemist, biologist, pharmacist, dentist, veterinarian as well as the physician all have much to contribute towards the advancement of pharmacology. We have had examples from each of these fields in our laboratory.

With respect to the faculty and physical facilities, Daniels and Goyan, in a previous conference on graduate instruction in pharmaceutical chemistry, have outlined the qualifications of the faculty for graduate instruction and the physical facilities required for such purposes. Many of their remarks apply as aptly to pharmacology. With respect to physical facilities, I have but to quote them:

> "The laboratories must be provided with all essential equipment necessary for competent work. Graduate students should not be expected to work on research problems with equipment that is inferior to equipment commonly used by other recognized workers in the field . . . Graduate instruction should be offered only by those institutions maintaining adequate library facilities."

With respect to the qualification of the faculty member responsible for graduate instruction:

> "He should enjoy the full confidence of his colleagues. He should have those qualities of leadership and scholarship that will enable him to direct the graduate student into productive research. These qualities usually can be evaluated from the number and quality of his published works. The faculty of a college offering graduate instruction must be 'strong' in the sense that its members are recognized for their contributions in their respective fields. It is most difficult to evaluate the adequacy of an individual instructor without regard to the faculty of which he is a part. A well qualified instructor is not likely to do his best as a member of a 'weak' faculty, whereas an active research group can be depended upon to stimulate the interest of graduate students."

In order to attract and hold men eminently qualified for graduate teaching of the caliber just described, the faculty member should not be burdened with heavy teaching loads and excessive administrative work. The teaching load of a faculty member engaged in graduate teaching should be de-

termined on a broad basis, including the number of registrants in his special study courses, the number of theses and dissertations that he is directing, the extent of his service on Master's and Doctoral committees and his responsibilities for aiding students to integrate classwork with practice.

The program of study should stress sound initial planning, proper interpretation and significance of methods and results rather than presentation of factual material dogmatically. This is likely even more important for pharmacology than for other disciplines because of the tremendous augmentation in descriptive material that has been made in this field. To realize this, one but has to think of the large number of new drugs which recently has been introduced. The prescription items requested today consist largely of agents which were unheard of fifteen years ago. However, the advent of a new therapeutic agent does not necessarily enlarge the general principles or methodology of pharmacology. Consequently, the course work in the general program must cultivate in the student those basic understandings, attitudes, habits of mind and mental skills which will not only provide the student with what he needs to enter the profession but even more important, will serve as a stimulus for further learning. In such a dynamic discipline as pharmacology, if the student cannot meet a changing world, we have failed to fulfill our objectives.

I presume that the invitation to speak here today was extended to me not for the sake of discussing generalities but specific measures. This I feel can best be accomplished by briefly presenting the programs which are established for the M.S. and the Ph.D. in Comparative Pharmacology and Toxicology at the University of California. The details of this framework, however, are subordinate to the indoctrination in the student of the concept that continuing critical self-education and creative scholarly efforts are his heritage.

At the University of California, recognition is accorded the wide scope and diversity of pharmacology by offering the graduate degree in Comparative Pharmacology and Toxicology on a general university basis. A graduate student, instead of being restricted to working in the Department of Pharma-

cology of the School of Medicine, can if he wishes, work with selected staff members of other Schools, Departments or Divisions of the University. Among this group are representatives currently from: Physiology, Biochemistry, Pharmaceutical Chemistry, Dentistry, Veterinary Medicine, Anatomy, Pathology, Biophysics, Medical Physics, Radiology, Bacteriology, Parasitology and Entomology.

In order to be accepted for graduate study in Comparative Pharmacology and Toxicology, the student must, in addition to having satisfied the general requirements of the graduate school (bachelor's degree and superior scholarship), have completed the following courses or equivalent thereof: Organic Chemistry (9 units), General Physics (8 units), Quanitative Chemistry (8 units), General Physiology (12 units), General Biochemistry (8 units), Microbial Metabolism (3 units), together with the prerequisites thereto. Any deficiency of the above courses may be made up during the initial period of graduate study.

The work leading to the Master's degree requires a reading knowledge of German or other acceptable foreign language, a thesis, seminars in pharmacology, and 20 units of course work, of which 8 units must be strictly graduate work in Comparative Pharmacology and Toxicology, 5 units in General Pharmacology, 3 units in Mechanisms of Drug Action and 4 units chosen from the following courses: Biochemistry of Enzyme Action, Physical Chemistry, Medical Physics, Insect Physiology, Helminthology, Medical Entomology, Chemistry of Insecticides and Fungicides, Protozoology, Veterinary Science, Toxicology. Other courses may be substituted with the consent of the chairman of the executive committee. The required 8 units of graduate instruction usually takes the form of special study involving a research problem under the direction of a member of the faculty.

As background for the Ph.D. degree the student must satisfy the following courses in addition to those required for the Master's degree: reading knowledge of German and one other acceptable foreign language, Physical Chemistry (3-6 units), Biometry and Biologic Assay (2-4 units), Pathology (5 units), Chemistry of Synthetic Drugs (3 units),

Seminar in Pharmacology. In addition, the student is held responsible for such additional subjects as the executive committee on Comparative Pharmacology and Toxicology may designate as part of the student's preparation. The passing of the designated courses does not necessarily assure that the background is adequate. The student is held responsible for recent advances of the subject as it appears in current literature. On completion of the course work, the student is examined by a committee of faculty members from several departments. Candidates are required to have a broad and thorough knowledge of those subjects that constitute a proper background to the general field of Comparative Pharmacology and Toxicology. On passing the qualifying examinations, the student is required to complete a research program leading to an acceptable dissertation which is evaluated by a committee of three faculty members. Success or failure of the graduate program, therefore, is largely dependent on the good judgment of the two separate committees responsible for the qualifying examinations and for appraising the candidate's dissertation.

The program which I have outlined is not considered nor intended to be fixed. Requirements have been altered after repeated discussion and debate among the various faculty members who constitute the committee in Comparative Pharmacology and Toxicology. I am not proposing, however, that this program is necessarily the one that should be adopted by other institutions. Each institution should direct its effort in the development and improvement of a graduate program in pharmacology so as to make most effective use of its personnel and facilities.

That the Colleges of Pharmacy have not been taking a passive interest in graduate as well as undergraduate teaching in pharmacology is indicated by the numerous seminars on the teaching of pharmacology similar to the present one which have been held since 1937. It was my pleasure to attend a very comprehensive seminar on teaching methods in pharmacology which was held under the auspices of the American Association of Colleges of Pharmacy at Purdue University in 1951, sponsored by the American Foundation

for Pharmaceutical Education. Although words are not deeds, the general discussions, opinions and recommendations emanating from such sessions are the blueprints for developing competent pharmacologists to serve the public needs, which apparently are becoming more acute. That some concrete advances have already been made is indicated by the fact that Colleges of Pharmacy are recruiting more and more pharmacologists for their respective faculties and are striving continually to improve the graduate program. It is significant that the number of graduate pharmacologists emerging from such institutions is steadily on the increase. The future holds even more promise.

Undoubtedly the views that I have presented have a familiar ring since many others before me have voiced similar opinions and in many instances perhaps more lucidly. However, I am grateful for the opportunity to express my personal views which consciously or subconsciously reflect those of my colleagues with whom I have often discussed this problem.

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The Medical Library Association will hold its fifty-third annual meeting in Washington, D. C., from June 15 to 18, 1954. Miss Marion Dondale, Librarian, Albany Medical College, Albany, New York, is president. The general chairman of the meeting is Lieut. Frank B. Rogers of the Armed Forces Medical Library, Washington, D. C.

The Objectives of Undergraduate Pharmacology and How to Achieve Them*

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Drake University, College of Pharmacy

Before we can discuss what is to be the objectives of undergraduate pharmacology in a pharmacy school, we must first decide what is to be the over-all objective of the pharmaceutical curriculum. Essentially, it is to train students for the profession of pharmacy, the great majority of them for retail pharmacy. Now, I should like you to bear with me while I repeat a few statements that have almost become hackneyed. We all firmly believe that pharmacy is a profession, but at the same time there is much talk about pharmacists in America failing to receive the professional recognition accorded to members of the other health professions. Let us always keep in mind that nobody will "give" pharmacists recognition, it must be earned by pharmacists themselves. It seems self-evident that if pharmacists are to be recognized as professional men, they must then render a professional service. In retail pharmacy today that service certainly is not the making and compounding of medicines as perhaps it was many years ago. I can hardly justify four or more years of college training merely to read a prescription accurately, and then transfer the directed amount of medicine from one container to another.

What, then, is the professional service of retail pharmacy? The curriculum at Drake University is built around what we consider to be the answer to this rhetorical question. We feel that the pharmacist, broadly speaking, is to be an *expert on drugs;* a source of reliable information on the action, uses and applications of drugs, not only to physicians, but also to veterinarians, farmers and the general public. I am personally convinced that there is a great need for such

*Presented before the Section of Teachers of Biological Sciences, at the 1953 meeting at Salt Lake City.

a service—new drug products are appearing on the market at a fantastic rate, and it is asking too much for a practicing physician or veterinarian to try to keep abreast of the field by critical study. He may hesitate to ask others in his profession for fear of showing ignorance, and sales representatives are often understandably biased and enthusiastic about the products of their own companies. In addition, more and more scientific articles on medical subjects, now often using scientific terminology, are appearing in the lay press. The pharmacist is the only person readily available to physicians and the general public who could answer such questions. It is the responsibility of the colleges to design curriculums to train men capable of rendering such professional services. Accordingly, such a curriculum must place major emphasis upon pharmacology and its prerequisites. I do not wish to detract from the importance of studies of manufacturing and synthetic processes, but, to my mind, these are of secondary importance to the professional service of the retail pharmacist. The time allotted and thoroughness of treatment of pharmacology in pharmacy schools should exceed that given in most medical schools, for, after all, drugs are only a small part of the general practice of medicine, while we are training specialists.

It is my wish to be practical in this presentation, and I fully realize that in many pharmacy schools there will not be sufficient time allotted in the curriculum to achieve all of the objectives I will outline. I am indeed fortunate in that at Drake University ten semester hours are devoted to pharmacology.

For convenience of presentation and subsequent discussion, I have considered the objectives of undergraduate pharmacology under five separate headings: (1) didactic pharmacology, (2) therapeutics, (3) laboratory pharmacology, (4) medical terminology, and (5) posology.

Didactic Pharmacology

For each class of similar drugs, a knowledge of their effects, an understanding of how these effects are put to practical use, and a respect for their dangers and limitations.

This topic constitutes the greatest bulk of subject matter to be presented. It is neither practicable nor desirable to discuss even all of the important individual drugs used in current therapy. Instead, similar classes of drugs, using specific, thoroughly studied drugs as prototypes, are discussed. Thus, drugs with adrenergic blocking action will undoubtedly be used many years in therapy, but the specific chemical compounds will change. Emphasis in teaching should be on understanding, rather than the memorizing of facts. I have found it most effective to introduce the topic with a brief review of the physiology of the systems concerned, with emphasis upon why the body works as it does. Then, if practicable, an outline of what happens to the normal physiology when upset by a disease process. With this background, the mechanism of action of the drugs can be discussed, and a rational basis given for their application to treatment of disease, their side actions and dangers. I feel that special emphasis should be placed upon the limitations of drug therapy. Distinctions must be made between drugs whose actions are curative and those whose use is only palliative or symptomatic. Likewise, common irrational and fallacious practices should be pointed out, such as the use of antihistaminics and antibiotics in the treatment of the common cold. Most certainly the pharmacist should be able to distinguish between drugs which are used, abused and useful—advertising claims, cash register receipts and isolated testimonials notwithstanding! Beyond these generalizations, how to achieve this objective will depend upon the understanding, ingenuity and enthusiasm of the instructor. Each class of drugs requires its own special treatment. Above all, drug actions must be explained in terms of the physiology of the body and fundamental pharmacological principles.

Therapeutics

An apreciation of the problems confronting the physician in the management of patients and clinical conditions, especially those phases of treatment not involving use of drugs.

Obviously, most of the drug therapy taught is included with diadactic pharmacology. However, after such study

alone, students may develop the false impression that proper selection of drugs is the main role of physicians after making a diagnosis. For pharmacy students, the objectives are limited, and there is no intention to train students to recommend full treatments. Instead, detailed discussions are limited to a certain few clinical conditions in which drug therapy plays an important part in the total management of the patient. Typical examples are the management of the diabetic, peptic ulcer, cardiac and hypertensive patient. Furthermore, patients with such chronic conditions usually have long and frequent contacts with the pharmacist, who should be able to answer their questions intelligently.

Since this phase of instruction is primarily clinical, it would be desirable to have it presented by a practicing physician. As long as there is proper correlation, this material could be presented either as a separate course or incorporated into the pharmacology lectures. We use the latter system, from time to time having two to four lectures devoted to certain selected topics. Professional ethics and physician-pharmacist-patient relationships may be profitably discussed here if not considered elsewhere in the curriculum.

Laboratory Pharmacology

An introduction to the design, interpretation and evaluation of experiments illustrating drug actions.

Generally speaking, the objectives of a pharmacology laboratory have been to illustrate the actions of drugs which are currently being discussed in lectures. However, I feel that more may be acomplished by placing primary emphasis upon laboratory experiments which demonstrate fundamental principles of drug actions, different experimental designs, and above all the necessity of controlled experiments. The actual experiments used, insofar as is practicable, may be selected to demonstrate different types of drugs and experimental techniques.

I have found laboratory objectives best achieved by a combination of three approaches: motion picture films, demonstrations, and group experiments. Motion picture films enable students to see clinical conditions which would other-

wise be impossible. Demonstrations need no further comment. Group experiments, I feel, can be of much greater teaching value than is generally realized. All experimental pharmacologists recognize that valid conclusions are seldom obtained from experiments on a very few animals, yet such experiments are commonly done in student laboratories. At Drake University, I have had gratifying success with group experiments arranged as follows. The plan of the experiment is laid out in tabular form on the blackboard, and each student has a mimeographed reproduction of that table. Students, generally working in pairs, do only a few experiments, using dosages and animals as indicated in the table. Each student then enters his results on the blackboard, and copies the results of the entire class onto his own mimeographed table. Discussion of this collected data, which always includes prominent control groups, may be conveniently done during a later laboratory period when films are scheduled. Such results afford excellent opportunities to point out the necessity for proper experimental design, the principles of biological assay, and the unreliability of limited observations and uncontrolled experiments. This discussion and evaluation of results obtained may well be of greater value than the experiment itself. By such experiments, students will be much better able to evaluate the validity of clinical claims for the effectiveness of new drugs. We are all familiar with the unfortunate practice of rejecting laboratory conclusions based upon a few uncontrolled experiments, but accepting as proven similarly obtained results from clinical observations. The point I am making is that the actual experiment done is of secondary importance to the lessons it teaches.

Medical Terminology

Ability to use the doctor's language.

If a pharmacist is to be able to speak intelligently with the doctor, and read the current literature on drugs, he must be able to use the language of the profession. Of course, a certain number of terms can be presented along with lectures and text assignments, but I feel that a special effort should be made. For my students, I reproduced in mimeograph a

table of prefixes, suffixes and root words used in medical terminology. Each was assigned a serial number, and weekly assignments made. Insofar as was possible, words assigned would correlate with those needed in the current lectures. For testing proficiency, on each examination a multiple choice question was set up wherein a series of verbatim dictionary definitions would be matched to the words. The ability of the students to recognize the meanings of unfamiliar, closely related, and sometimes rather bizarre medical terms was very gratifying.

Posology

Ability to recognize excessive dosages of potent drugs.

With the great number of drugs now used in current therapy, it is not reasonable even to require students to memorize those most commonly used. Neither do I feel it is any more rational to limit memorizing to the USP and NF. With the curriculum as crowded as it is, students should not be required to commit to memory anything which will not be of definite value. Accordingly, I have considered that the objectives of the study of posology should be limited to the ability to recognize excessive dosages of potent drugs. Specific doses of specific medicines, when a doctor inquires, may be obtained from suitable reference books.

I would suggest that a list of drugs whose doses are to be learned be prepared in mimeograph. Since doses are usually learned in pharmacy courses other than pharmacology, this one list should be the result of the cooperative action of the entire faculty and used in all courses. Similar drugs with only slightly different doses could be grouped together under a single arbitrary dose, such as the systemic sulfonamides, short acting barbiturates, antihistaminics, and the like. Only important exceptions would need be learned. It is also questionable whether it is necessary to commit to memory certain drugs which are prepared only for parenteral use in single dose containers. Discretion must be used in preparing such a list that it does not become too large.

Up to this point, I have discussed methods currently being used at Drake University. The suggestions on posology,

however, have not yet been put into effect, but have been discussed informally with the faculty members. We plan to start work on such a table this fall.

In conclusion, some of you may feel that I have considered pharmacology as either too broad or too narrow a subject. In some schools topics I have considered as pharmacology may be included in related courses, such as pharmacagnosy, organic medicinal products, bioassay and therapeutics. Conversely, apparent omissions may be because I considered such topics as structure-activity relationships and the actions of the minor vegetable drugs the province of organic medicinal products and pharmacognosy, respectively. The important thing is not the name of the course, but that the graduate in pharmacy be adequately trained in his four or five years in college.

Research in Pharmacy Administration*

HAAKON BANG

State College of Washington

It is usual that the chairman deliver an address incorporating those suggestions or ideas which are uppermost in his mind.

The colleges of pharmacy have not had a long history of great volumes of research. Early in the development of pharmacy colleges, when there was only a two year course, very little research was carried on; but since the establishment of the four year course, and the improvement of the quality of the teaching staffs, much more has been done.

Much of the first research was in the fields of pharmacy, pharmacognosy, and pharmaceutical chemistry. Recently, however, there has been emphasis in the field of pharmacology. The newest is that of pharmacy administration, and we

*Address of the Chairman of the Section of Teachers of Pharmacy Administration at the 1953 meeting in Salt Lake City. Dr. Bang is Dean of the School of Pharmacy.—Ed.

should certainly advocate and stress research in this field. It is wise to do so since most of our member colleges are state institutions and should serve the profession.

There are many branches of the field of pharmacy administration in which research might be carried on. There are many studies that need to be made, such as, prescription pricing, and buying for the prescription department, just to name two. I am certain that surveys and studies would be encouraged and would receive the full cooperation of the pharmacists.

In other fields of pharmacy, such as pharmaceutical chemistry, pharmacy pharmacology, and pharmacognosy, much of our original research was done on more or less of an empirical basis. More recently, however, the studies have been quantitative. We measure quantitatively, for example, drug actions. In pharmacy administration we should likewise think of quantitative studies so that there will not be as much guess work in the operation of our pharmacies. I am certain more exact studies can be made. I am also certain that these studies will be welcomed by the owners who will like to know not only the qualitative answer to their problems, but a quantitative answer as well.

We are now training a number of men, such as Mr. Kern and Mr. Hampton, whose education is being subsidized by the American Foundation on Pharmaceutical Education. Training in business administration and economics should qualify them for exact research procedures. These men should be encouraged and should be given every opportunity to do as much research as possible.

As an administrator in pharmacy, I realize the difficulties that lie behind the statement just made. In most of our colleges it is necessary for a man not only to teach in the field in which he is most suitably trained, but also to teach in his minor field. Very frequently our teaching loads are heavier than they should be, but administrators should endeavor to get staffs of such a size that every member has an opportunity to carry on a research project. This should not only be true for the teachers of pharmaceutical chemistry,

pharmacognosy, pharmacology, and pharmacy, but should be especially true in the field of pharmacy administration.

The one idea I should like to stress and the thought I should like you to take home with you is not a new one. We should endeavor to set up extension divisions in pharmacy administration to better serve the pharmacists in the district in which the school operates. This service is needed by the practicing pharmacists since pharmacy administration is so very close to them. Extension divisions in our schools and colleges of pharmacy would function very much like the extension divisions in home economics and in agriculture. As you know, this idea is certainly not new, as many of our schools already have such extension departments. But many more of our schools do not offer such a service to the practicing pharmacists. I am certain that if we were to speak to our residents, and boards of regents, that we could sell them this idea.

If we do this and are successful, we will get much better support from the profession.

Difficulties in Teaching Drug Store Management*

CHARLES C. RABE

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The teaching of every course in the curriculum involves certain problems, and it is not uncommon for educators to feel that their particular courses are the most difficult to administer. Many of us who are engaged in teaching Drug Store Management can attest to our own problems, some of which may be attributed to the fact that the subject is comparatively new in pharmaceutical education.

*Read before the Section on Pharmacy Administration of the Council of Teachers at the 1953 meeting in Salt Lake City.

Student attitude is the most common source of difficulty, although it is not infrequent that the attitude of other educators takes on a complexion indicating less than full acceptance of the importance of such a course.

Problems encountered in connection with student outlook may be due in part to the fact that Drug Store Management is taught in the senior year. By the time the student has progressed to senior status he has been given considerable professional training, and may have developed an immunity against accepting pharmacy as a business as well as a profession.

There is also the danger that the senior student will have acquired the feeling that he knows all that there is to know about the operation of a drug store by virtue of his having worked in one or more stores. While it is not to be inferred that all such work-training is bad, it can be said with more than a fair degree of certainty that such training has often been detrimental to the student. At times there exists a strong feeling among some students that what is being taught is a lot of nonsense, because the pharmacists for whom they worked did not follow the principles and policies laid down in the course in Drug Store Management.

That work-training can be far from satisfactory has been proved on numerous occasions. For example, just recently a class of some eighty students was asked to calculate a simple pricing problem. It should be added that the general subject of pricing had not yet been discussed in class.

The students were requested to price an item costing $2.50 so that the pharmacist would show a gross margin of 38%. They were told to determine the selling price as they would in actual drug store practice. It was alarming to find that 49% of the class arrived at incorrect answers, most of which were the result of using cost price as the basis for markup.

The discouraging feature of the results was the fact that every member of the class had had either retail drug store or hospital pharmacy experience. And what made the situation even more disturbing was the opinion of many of these same students that they would be ready for managerial positions immediately following graduation. This one illustration

is not necessarily a criterion of what students have learned, or have failed to learn, during drug store apprenticeship, but it does raise certain doubts.

Additional evidence of the harmful effect of drug store experience is often reflected in the attitude of some students toward the promotion of nationally-advertised products. They admit to believing that such products should not be given choice display space in the store. A certain percentage of students, and of people in general, is always cantankerous and will argue a point just for the sake of argument. But the number of objectors is large enough to justify a belief that they have been indoctrinated with a poison of hate against the manufacturers of drug and related products.

Additional confirmation of the faulty molding of student opinion by a minority of practicing pharmacists is noted in regard to their approach to the substitution problems, that is, in the field of trademarked prescription specialties. We are faced with the reality that if a student is exposed to evil for any length of time he may eventually subscribe to the same unethical principles. And a thorough discussion of business ethics will fail to impress those who have already made up their minds about such practices.

We have not been immune to attack by drug store owners, some of whom take a dim view of our efforts in the teaching of Drug Store Management. In hiring recent graduates they often seek men who will be placed in managerial positions, and they direct criticism against the colleges if these men fail to meet expectations. They have lost sight of the fact that a college degree does not imply proficiency in handling the host of problems that accompany the operation of a retail business. Many of these same pharmacists became drug store owners in an era when success depended to a great extent upon one's willingness to work seventy to one hundred hours per week. They had competition, to be sure, but not the intensive competition that is now so prevalent. Nor did they have the acute personnel problems and governmental red tape that plague us today.

In conclusion may we suggest the possibility of overcoming some of the problems we have described by means

of a division of Drug Store Management into two courses, each of which would carry three hours credit. One course, involving a study of the basic principles of drug store operation, would be taught in the sophomore year; the other, consisting of a study of applied principles, would be given in the junior or senior year. Through such a plan the student would be oriented in the dual nature of pharmacy early enough in his college career to grasp the full importance of the business courses. And having been taught accepted principles of business conduct at an earlier state of his education, he might be less prone to endorse the faulty practices of certain of his employers. While we have had no opportunity to put the above theory into practice, it is our honest conviction that the suggested change is worthy of further consideration.

Correlation Between a Teacher of Pharmacy Jurisprudence and a Teacher of Pharmacy Dispensing

ESTHER JANE WOOD HALL

University of Texas

The Pharmaceutical Curriculum refers to Dispensing Pharmacy as the "terminal course of the pharmaceutical curriculum." This course to provide for a correlation and integration of the previous instruction in the development of the pharmacist as a professional person.

Dispensing Pharmacy is called a "climax" course in the education of a pharmacist, but we find upon examination that the course in dispensing pharmacy is placed in various years

*Presented before the Section of Teachers of Pharmacy Administration at the 1953 meeting in Salt Lake City. Mrs. Hall is Assistant Professor of Pharmacy Administration and a Fellow of the American Foundation for Pharmaceutical Education.—Ed.

in the curriculum of the accredited colleges of pharmacy, with a majority offering it in the fourth or fifth year. The fact that Dispensing Pharmacy is not placed in the fourth or fifth year leads one to believe that it is not regarded by many as the capstone course. For that purpose of this discussion, it is assumed that the course in Pharmacy Dispensing, at least follows the course in Pharmacy Jurisprudence.

One of the objectives of the course in Dispensing is "appreciation of the legal aspects of prescription practice," and listed among the items which the instruction in Dispensing Pharmacy should include is "Legal Aspects of Prescription Practice—Applications and Technicalities" (the prescription —general, narcotic, and alcohol; federal and state laws.)

With the practical viewpoint ever in mind in the presentation of teaching material, the teacher of Pharmacy Jurisprudence, like the teachers of all courses in instruction, can contribute much to dispensing by correlating the subject matter, whenever it is possible to do so, in such a manner that the fundamental knowledge gained by the student will be meaningful to him in the compounding and dispensing of prescriptions.

In making his contributions to Dispensing Pharmacy, the teacher of Pharmacy Jurisprudence may be fully cognizant of the fact that, in this course, the student is expected to acquire the knowledge which will, with his limited background of the fundamentals of law, enable him to conduct his professional and related activities legally and without needless risk. Of greater significance to the teacher of dispensing and, therefore, of more value and interest to the student, are the important dispensing points involved in the compounding and dispensing of prescriptions which might present situations where danger lurks and out of which litigation might arise, and from which the pharmacist in the performance of his professional duties may readily recognize as hazardous.

The presentation of such information in the course of Pharmacy Jurisprudence, which is in the department of Pharmacy Administration, of course, presupposes the cooperation of members of the pharmacy staff. Obviously, they are the ones who should suggest to the teacher of Pharmacy Juris-

prudence the significant dispensing data that might involve a legal situation. Furthermore it presupposes the formulation of a properly correlated plan designed to include a discussion of these dispensing points as an integral part in the discussion of Pharmacy Jurisprudence to which they relate.

In an attempt to organize the subject material for such a presentation, members of the pharmacy staff handling the course in dispensing met with the teacher of Pharmacy Jurisprudence. At these meetings, the outline for the course in Pharmacy Jurisprudence was studied against the one for Pharmacy Dispensing. Suggestions were made on points that might be emphasized in jurisprudence and further illustrated in dispensing. Each point in both outlines that directly related was discussed and suggestions were made as to what extent they need be explored in the presentation of the course in Pharmacy Jurisprudence and which ones would again be tackled in Pharmacy Dispensing.

To illustrate some of the information that was suggested:

The prescription file as a record—after discussion in Pharmacy Jurisprudence could be illustrated by the actual use of files for prescriptions compounded in dispensing, with the proper legal separations.

The use of the telephone and the liabilities involved are discussed in Pharmacy Jurisprudence, with actually using the multiple PAX telephone system with simulated telephoned prescriptions to the students, followed by compounding and proper recording in Pharmacy Dispensing.

Deciphering illegible prescriptions is further illustrated in pharmacy dispensing by the use of the Bel-Optica where students copy direct from the reproduction, interpret and compound the prescription.

The importance of reading the manufacturer's label is demonstrated by the actual handling of the properly labeled package, studying the label statements, and interpretation of the information as related to the retail pharmacist.

Incompatibilities. The course in Pharmacy Jurisprudence includes numerous illustrations of decisions that have been handed down in cases that were the outgrowth of the pharmacists ignorance of incompatibilities. The dispensing instructor spends the equivalent of ten weeks discussing all phases of this subject, illustrating the right and wrong methods for compounding, and the responsibilities involved in so doing.

Dosage checking as a responsibility of the pharmacist and the liability involved in failure to do so, is illustrated in the dispensing laboratory by prescription checks, spot-checking by the instructor for dosage of various ingredients in the prescriptions.

Handling of narcotics, barbiturates, and alcohol: The state and federal laws for all three subjects are discussed in Pharmacy Jurisprudence. In Pharmacy Dispensing as many situations of fact as possible are demonstrated throughout the course. In the case of narcotics; the student goes through the mechanics of ordering narcotics on facsimile forms, labels all narcotic prescriptions according to law, fills narcotic prescriptions for exempt officials, and prepares the one ounce of the 20% aqueous or oleaginous narcotic preparation permitted on an official order form, and a discussion is given by the instructor showing why this is necessary on the basis of stability. The other laws are handled in similar ways.

Standards of Prescriptions filled. Periodically throughout the semester a prescription that lends itself to an assay is picked up and assayed for content by the Pharmacy Dispensing Department, and the results are returned to the student as an illustration of the possibility of error in compounding and corresponding liability involved.

Other points considered at these meetings which might be of interest were:

The use of the after-hour recorder as a legal record.

The use of the micro-film as a record.

Secrecy of the prescription and how it can best be emphasized.

The use of the tape-recorder as a verification of a telephoned prescriptions.

The several points outlined above represent a part of the plan that is being formulated at the college for the purpose of supplementing the factual information presented in the Pharmacy Jurisprudence course. The organization of the subject matter, with the cooperation of the teacher of Pharmacy Dispensing, and the subsequenlt presentation of it from a practical viewpoint offer to the teacher of Pharmacy Jurisprudence a unique method of approach in an attempt to make a realistic contribution to the course in Pharmacy Dispensing.

The Use of Pharmaceutical Trade Journals in the Teaching of Pharmacy Administration*

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You will notice the designation, "Pharmaceutical Trade Journals," in the title of this paper. That is intentional. I have neither the desire nor the qualifications to talk to you about that part of the content of pharmaceutical journals that deals with professional problems.

My purpose here is to speak about the use, in the teaching of Pharmacy Administration, of those parts of the content of pharmaceutical journals that deal with matters that, if discussed in the classrooms with students of pharmacy, will give them a better and more complete understanding of the economic problems that confront the pharmaceutical profession and the drug trade.

A related purpose is to provide students with more information about the business practices and general characteristics of the drug trade.

It is now more than 20 years since most students entering pharmacy have had to enroll for a course of study with a minimum length of four years. These students have had the benefits of a curriculum that is more nearly collegiate in character than was the case when the course of study was three years or even two years in length.

In that earlier day the typical career of a pharmacy student had begun with part-time work in a drug store while in high school. The alert employee quickly recognized that graduation from a pharmacy college and license as a pharmacist would be needed for any but the most routine work in a drug store.

*Read before the Section of Teachers of Pharmacy Administration at the 1953 meeting in Salt Lake City. Dr. Olsen is also Director of Marketing Research, Drug Topics and Drug Trade News.—Ed.

The personal background of the students who enter pharmacy nowadays is more diverse. Some, in fact, enroll now in pharmacy colleges with no drug store background at all. It is nonetheless true for a large proportion of present day pharmacy students that their interest in the profession was first awakened by drug store employment.

It is natural therefore that so far as the business and economic problems of the drug trade are concerned, most and often all of their knowledge is limited to retail drug stores.

I make this preliminary statement before going into the main part of this presentation so that it will be clear why I think there is more than just drug store management to the economic and business problems with which today's pharmacy students should be acquainted. We know, on the one hand, that the background and breadth of view of these pharmacy students is getting wider all the time.

We also know that the fields into which pharmacy graduates are going and for which they are eminently qualified are far more extensive than ever before. It seems to me therefore that as teachers of pharmacy administration we have a responsibility to try to acquaint them with what is to be found in a branch of business journalism with which in their later careers they must have an extensive familiarity.

I should add here, parenthetically, that among people in the drug trade with no background in pharmacy there is general recognition of a deficiency in their knowledge that is represented by the precious and irreplacable hours of practical experience in drug stores that are possessed by all pharmacy students.

There are over 100 pharmaceutical journals published in the United States. A good place to begin in acquainting pharmacy students with what to expect to find in them is by explaining to them something about the different kinds of publications that serve this field. Some of this will seem elementary but there are surprising gaps in students' knowledge. A confusion of proportions that often are amazing is frequently to be found in their understanding of the nature and purpose of the various pharmaceutical journals.

One way to group these trade journals is by the branch of the drug trade to which they are addressed. Some are intended to serve manufacturers, wholesalers and other suppliers. Others are directed to retailers.

Another classification is by the extent of their distribution or circulation. Some are national, others sectional, and still others, local.

Still another grouping is by sponsorship and circulation method. Some are publications of pharmaceutical manufacturers. In publishing parlance, these are company magazines or house organs. Others are under the aegis of national, state and local pharmaceutical associations. A third group is composed of the publications which are sold on subscription. Finally, there are the journals which are known in the publishing business as controlled circulation magazines. They are the journals which are sent by their publishers without charge to the recipients to persons in the particular part of the drug trade to which the magazine is addressed.

Finally, a classification of drug trade journals can be made according to their content.

When this stage has been reached in the description of these publications, the opportunity comes to point out the use and value of their contents to pharmacists and to others in the drug trade.

In this classification of drug journals according to content, my connections with the publishing business lead me to bring up first those which are news publications.

What right now is more fateful to the drug trade than the situation about fair trade? The principles, purposes and aims of fair trade are described at length in the text books and other reference works.

How much more alive the subject becomes when to those descriptions can be added the up to the minute developments on the subject of fair trade, that are being reported in such great numbers right now in the drug journals. News developments of this kind assume even a greater value as teaching material when the students themselves dig out and present as classroom assignments the news of these late develop-

ments. And to these factual reports can be added comment on the meaning of the latest events.

Another series of events that have both economic and professional significance has been occurring in recent months. That is the series of court decisions which sharply curb the powers of the state pharmacy boards to limit the retail sale of medicinal articles to drug stores.

The legal basis on which these restrictions rest in the state pharmacy laws is thoroughly explained in various text and reference books. I appreciate, too, that some aspects of these recent developments are legal problems. I maintain, nonetheless, that the teaching of the economic aspects of the matter can be vastly improved by systematic methods of introducing the latest developments into the classroom assignments.

Just by way of variety, another direction in which news developments can be put to as profitable a use in pharmacy administration, there are the changes which occur in the prices for fine chemicals, drugs and the thousands of other different kinds of raw materials that are used in pharmaceutical manufacture. The great need in the trade for up to date information on this important subject causes thousands of dollars to be spent annually in collecting and publishing these facts. These facts have use also, I think, as teaching material.

A development from these news reports is a collation of them accompanied by analytical comment. It is the regular practice in the printing of news in drug journals to report, for example, the sales, earnings and other financial information that is made public about their affairs by individual companies in the drug trade.

A useful step then is to bring together all that has been printed about the various companies in one particular part of the drug trade. Such a tabulation would show—by way of example—for the 15 or 20 chain drug store companies which make public information of this kind their sales, margin, costs and profits.

A tabulation of this kind shows not merely how each individual chain drug store company is making out. It also shows its relative position compared to the others. The

printed comments which accompany these tabulations will suggest many different ways in which they can be expanded for classroom discussion.

News gathering in the drug trade as in other branches of journalism is necessarily dynamic. It calls not merely for reporting events as they occur. It requires, in addition, the seeking out of facts and opinions that a skilled reporter recognizes are of general interest.

The results of this news gathering are manifold. It has been possible, for example, to collect and publish facts which are a trustworthy estimate of drug store sales. It has been possible to extend this news gathering, moreover, in such a way as to apportion them among the many different kinds of articles that are sold in drug stores.

Thus the composition of drug store sales is revealed for study by pharmacy administration students and anyone else who is interested.

Another source of teaching material from trade journals for pharmacy administration students arises from editorial correspondence. The problems that are thus brought to the attention of the people who write for these trade journals then form the basis of articles when the problems presented are of general interest.

Still another source of material from trade journals that can be used with pharmacy administration students is the "how I did it" type of article. These are the articles in which some member of the drug trade generously shares with his fellows the success he has had in overcoming some particularly difficult problem.

The "how I did it" article may be, on the other hand, an original method that is distinct and unique. Either way, the material in these articles form the basis of the kind of case and problem material that in other branches of collegiate teaching is eagerly sought.

Please understand that in designating these two sources of teaching material from pharmaceutical trade journals as "how I did it" articles, it is equally possible for the facts to be presented as a third person article by a competent and observant reporter.

I am sure that within the limited horizon of my own experience I have not touched on all the different possibilities that have occurred to you for using trade journal material in Pharmacy Administration teaching. It is possible that I have failed to mention some that you have found vastly more important than those I have listed.

The purpose of these meetings was ably and aptly stated in the address to us a year ago at Philadelphia by Dean Chauncey Cooper in his Chairman's address. He emphasized that meetings of this kind are a workshop for the exchange of ideas on our mutual problems.

I have given you the ideas which have seemed to me of most interest that are within the scope of this topic. I hope that you will find them of some value.

The Pharmacy School Teacher and Pharmacy Legislation*

JOSEPH H. GOODNESS

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Generally speaking, teachers and legislation are strangers. The teacher in a pharmacy school is no exception. Yet teachers, because of their occupation with education and study are frequently the most able representatives of the public in public matters of legislation. The loss of their services in legislative matters is therefore more harmful than that of the average member of society. This is particularly true when the pending legislation concerns the subject matter or profession which the teacher teaches.

If the reason advanced for nonparticipation by the teacher is that he knows little or nothing about the law, it will be a surprise to him to learn that most of the effective

*Presented before the 1953 meeting of the Section of Teachers of Pharmacy Administration in Salt Lake City. Prof. Goodness is professor of Pharmacy Administration.—Ed.

work connected with legislation activity is not legal. If anything, it is mostly education, although politics and plain salesmanship may at times be large factors. Neither politics nor salesmanship is, however, more powerful in legislative matters than plain knowledge and an expression of opinion based on that knowledge. The teacher with his capacity and ability to educate can create this necessary knowledge.

When legislation is pending, the need for knowledge is great. Theoretically everyone should know of the pending legislation and the subject matter it is intended to affect, for a request for a law is a request by one or a few for permission of all, and such permission cannot be granted by all unless all know of the request and what is requested. In practice the involvement of persons is not so great for the public has its representatives and the requesters have their associations leaders; but since the law will apply to all, the legislators selected to consider the request for a law before it is acted upon by the congress or legislature may hold public hearings for the purpose of letting the public make known its views. In the United States there also exists that very American custom of writing to one's representative or senator requesting him to do as one wants him to do: to vote as the writer wishes him to vote on pending legislation. The final effect is that everyone, by one means or another, may exert an influence in the matter of legislation while such legislation is pending. Once the law is enacted only the court or new legislation can change it.

When pending legislation might affect pharmacy, the "value" of the pharmacy school teacher becomes apparent. His knowledge is useful to educate the legislative committee seeking to determine the effect on public health and pharmacy if the bill or proposed law became law. The practicing pharmacist also wants to exchange views on the effect of the proposed law before he expresses his opinion. The student of pharmacy should be informed of proposed laws that will affect him when he enters the profession. And the public may seek the view of the educator. But unless the teacher accepts his duty to provide this "value", the value will be hypothetical and unrealistic.

The subject of the teacher and legislation is timely in pharmacy because of the certainty of coming events. Pharmacy bills are certain to appear in the next few years in many states. There is also great likelihood that many of these proposed laws will be harmful to the prescription activity of the pharmacist. It will be the duty of pharmacists to protect the public health, pharmacy, and their own professional standing in the eyes of the public.

The passage of the Federal Food, Drug, and Cosmetic law in 1938 caused many states to duplicate its provisions in their own laws. That law, in section 503, was so ambiguous in its reference to the sale and labelling of drugs dispensed on prescriptions, that the state laws based on it, after interpretation by each state as to what section 503 meant, ranged from almost complete rejection of all controls over prescriptions to the most rigid and oppressive controls and restrictions.

In 1951, section 503 (b) was changed in the Federal Food and Drug law by the Durham-Humphrey amendment. The federal amendment became effective in 1952, at a time when some state legislatures had already adjourned or were well along in their legislative year. Some states considered the question of amending state laws to conform to the federal pattern in 1953; others will work on the question in 1954 and later. In some states the enforcement of the Food and Drug law or the drug provisions of the law are vested in the board of pharmacy; in others it is in non-pharmacy boards.

These various conditions make it impossible to forecast the nature of the future bills for legislation in any state, but certain facts concerning pharmacy and state food and drug laws are already clear. The first of these is that the general tendency is for states to duplicate as nearly as possible the provisions of the federal law. There lies a danger for pharmacy, for the Federal Food and Drug law by its very specificity in section 503 (b) makes it illegal for pharmacists to refill prescriptions in emergency when the doctor has failed to note on the prescription that it may be refilled. A survey has shown that 80% of the written prescriptions have no notation allowing refilling, and not because the doctor re-

fused to give such authorization but because he is operating under the old ingrained understanding that refillings are permitted when made in good faith and for medicinal use. A duplication of this federal provision in a state law will be detrimental to both public health and to pharmacy. Another inequity in the federal law exists in what it does not say, which omission must be corrected at state levels. By applying the prescription restrictions concerning filling and refilling exclusively to pharmacy, the unethical medical practitioner is free of the law when he opens a prescription clinic in competition with pharmacists. Through such an establishment he *dispenses* drugs (not *administers* drugs) without restrictions if he so chooses. The federal law needs correction on this point. State laws should not invite such an unethical practice which the code of ethics of medicine forbids and which pharmacy cannot tolerate.

The teacher, the board of pharmacy, and the state pharmaceutical associations should work together to forestall the enactment of these inequities in their state law, and if they have already been enacted, to exclude them by amending legislation.

Inaction, resignation, and frustration have become characteristics of too many pharmacists in matters of law. This docility is not universally serious, but in matters concerning the professional aspects of pharmacy it is. We cannot remain inactive or docile if such behavior could lead to the adoption of laws curtailing the right of pharmacy to perform its professional services for mankind. Experience has shown that bills seeking laws to regulate pharmacy, when proposed by non-pharmacists, have too frequently been needlessly restricting and oppressive. Pharmacists had failed to educate the proposers of the laws.

Teachers of Pharmacy Administration having great familiarity with the business and legal aspects of professional pharmacy and retail pharmacy bear a correspondingly greater duty in matters of legislation, but no teacher in a pharmacy school is without obligation to the profession and the duty to do his part for good pharmacy legislation. Our obligation to pharmacy, to former students engaged in active practice,

to society in general because of our special training, should make us undertake willingly whatever task is required to assure that every pharmacy law in our state or the nation shall be a good pharmacy law from its first day, and that the days of existing bad laws for pharmacy shall be few.

The Chairman's Address*

SECTION OF TEACHERS OF CHEMISTRY

MELVIN W. GREEN

Director of Educational Relations
American Council on Pharmaceutical Education

Members of the Section and fellow teachers:

It is a pleasure to be here today and to have participated in the activities of the Section during the past year. It is my belief that the Sections perform a most useful function in pharmaceutical education because here we meet more or less informally to discuss problems of mutual interest. What I have to say will be very brief for I do not wish to detract from the fine program that we have.

I have been fortunate, indeed, during the past year to have been able to visit with many of you individually and to see first hand the many activities going on in all of the fields in our colleges. As a result of these activities there are certain observations that I would like to take this opportunity to make.

Subject matter wise, our most serious problem arises from the fact that new drugs and new data on old drugs appear on the scene with a frequency that is almost unbelievable. It is almost hopeless to teach all of the information we are inclined to believe to be needed by our students about pharmaceutical chemistry of the moment. And yet experience of the past decade would appear to indicate that 10 years from now many of the drugs about which we teach

*Read before the Section of Teachers of Chemistry at the 1953 meeting in Salt Lake City.

will have left the scene and countless more will have replaced them. Basic scientific concepts will change too. Consequently, if we are going to do justice to our students, we should be putting more emphasis on the teaching of general concepts and less on detailed memorized data. Based on electronic theory, polarity and other present day concepts, students should be taught more and more to reason from structure to solubility, stability and other properties in terms of functional groups more than in terms of individual compounds. Another reason for the necessity for the more general theoretical or physical-chemical attack springs from the fact that modern pharmacy is approaching formulation and dispensing problems from a less empirical avenue. I do not mean to imply that this type of teaching is not being carried on now, for it is, but I simply wish to emphasize its importance.

Another serious problem confronting pharmaceutical chemistry revolves around laboratory teaching. This is not a problem peculiar to chemistry, for it is general in all courses having laboratories. The problem springs from the fact that all areas of instruction are making great claims upon the student's time. Consequently, we need to look carefully at each laboratory course and ask ourselves, is a laboratory really needed in this course, and, if it is, what are the objectives in the laboratory phase of this course and how many hours are really necessary to accomplish the objectives without resort to busy work?

It seems to me that a laboratory course is given for several reasons. In some cases an experiment is designed to teach a skill, in others to illustrate a principle, in all cases it is supposedly contributing to the making of a good pharmacist.

Let us look at our individual experiments more critically. Here is an experiment in a course in pharmaceutical chemistry. Is its purpose designed to teach a skill; does it teach that skill or could it be modified in such a manner as to perform that function better? If it is designed to develop a skill, how much skill should it produce? Should it be repeated, with modifications, over and over again until the

student becomes very adept, or should speed and dexterity be left until the student gets into practice?

Then we turn to another experiment. This one is apparently used to teach some general basic principle. Let us examine the experiment closely; does it accomplish this end. Perhaps the experiment is too involved. By simplifying the experiment it may be easier for the student to see the principle involved. Does the experiment nearly always work? If it doesn't, it may defeat its purpose. In fact, the student may become convinced that the principle is not a true one because his experience with it was a total failure.

Here is another experiment, apparently designed to teach the basic pharmaceutical and chemical properties of a certain drug. Does it accomplish this end? Is it specific—if so, is it specific for a class of drugs or actually specific for this one drug alone?

There are many questions that we need to ask about individual laboratory experiments. We need to explore just as carefully the goals of whole laboratory courses. For example, should there be a laboratory course in the chemistry of organic medicinal products? If so, what are the objectives of the laboratory phase of the course? What kinds of experiments will best meet these objectives?

I would like to suggest that at some future meeting of the Section, we give serious attention to the matter of laboratory teaching. In saying this I do not mean to imply that the matter of laboratory instruction is the only area that needs attention. We can all use, to advantage, better methods of instruction, better examinations, and means of keeping our courses vital and in tune with the times.

The American Foundation for Pharmaceutical Education which was chartered in 1952, has already expended over two million dollars to strengthen all phases of pharmaceutical education. It has awarded nearly 300 graduate Fellowships and over 1175 undergraduate scholarships. The Foundation receives its income from the voluntary support of over 175 firms in the manufacturing, drug, chemical, pharmaceutical, cosmetic, proprietary, surgical dressing, container and related industries, chain drugstores, drug wholesalers, the pharmaceutical press, and other industries serving or closely associated with pharmacy.

A Symposium on the Fate of Quantitative Analysis and Pharmaceutical Assay*

AN INTRODUCTION

C. E. MILLER

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Several years ago curriculum changes were the order of the day at North Dakota Agricultural College and no doubt this upheaval was noted at many other institutions. The thought foremost in mind was, "What is best for the student who will become one of the practicing retail pharmacists of tomorrow?" As chairman of the department of pharmaceutical chemistry it was my responsibility to justify my several courses then in effect and to recommend changes in credit hour value as need be.

The evidence is slowly but surely accumulating that in the present four year curriculum there is not adequate time to present the many new phases of instruction. Examples of these newer phases are in the field of pharmaceutical administration, proprietaries, and the biological sciences. What about the several courses in pharmacy, materia medica, and chemistry that you and I were required to take? Will some of these older courses fall by the wayside?

Considering our own field of specialization—chemistry—and more specifically that subdivision known variously as "assays," "quantative," "pharmaceutical analysis," etc. In the light of the administration perhaps the most frequent questions, with possibly an undertone of criticism, put to the professor in charge are: "Why should the retail pharmacist be required to take coursework which obviously he will never use in the future?" "Are you going to make control chemists of all of our students?" "Is it not possible for the pharmacist of today to carry out his professional requirements without a

*Read before the Section of Teachers of Chemistry at the 1953 meeting in Salt Lake City.

knowledge of quantitative pharmaceutical chemistry?" "Shall we require quantitative only of those who wish to specialize in commercial work?" These are type questions which all of us assembled here this morning, I am sure, have been confronted with at one time or another.

In my chairman's address before this group at Philadelphia a year ago I expressed concern over the ultimate disposition of quantitative pharmaceutical chemistry in the pharmacy curricula of tomorrow. I recommended to the chairman-elect, Dr. Melvin W. Green, that a timely symposium topic for this year might be developed around the topic "The Fate of Quantitative Analysis and Drug Assay in the Pharmacy Curriculum."

Chairman Green and Secretary Kelley have arranged a panel of four speakers who will present the academic and industrial view points on the importance of the subject matter. The four papers that follow constitute the symposium.

In Revising Curricula What Should Be Done About Quantitative Chemistry and Drug Assay Courses?*

LEE F. WORRELL

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Ever since *The Pharmaceutical Syllabus,* Tentative Fifth Edition (Revised), published in 1945, failed to recognize by name a course in drug assay or pharmaceutical analysis, numerous pharmacy educators and curriculum planners have been taking the position that such a course was part of the "dead-wood" which could be eliminated in an attempt to avoid

*Part of a Symposium by the Section of Teachers of Chemistry at the 1953 meeting in Salt Lake City. Dr. Worrell is Associate Professor of Pharmaceutical Chemistry.

the necessity for either an extended curriculum or one or two pre-pharmacy years as entrance requirements. It seems obvious that such individuals failed to pay adequate attention to the detailed outline of a course entitled "Quantitative Chemical Analysis" presented in the same publication. This was listed as a required course with a minimum of 160 clock hours. A minimum of 64 hours was allotted to didactic work leaving a minimum of 96 hours for laboratory work. Although such a division of hours would, on the usual basis of one credit hour for one didactic or three laboratory hours, normally result in the allocation of 4 semester credit hours for the didactic portion and 2 semester credit hours for the laboratory part, it is interesting to note that a total of 7 semester credit hours were designated for this course by *The Syllabus*. Whether or not this was implicit recognition of the fact that students could not reasonably be expected to complete even the required portions of the outline—to say nothing of the optional listings—in the minimum time proposed for the course is unknown to the present speaker. We find in this outline an attempt to describe a course which is essentially a combination of a standard, fundamental course in quantitative analysis and an applied course in pharmaceutical analysis. Recognition is given here to the thesis that the pharmacy student needs to have some knowledge of how the fundamental theories and techniques of quantitative chemistry are applied and utilized by members of his profession in the interests of the public health. It is unfortunate that the specialized objectives of a professional course in pharmaceutical analysis, as contrasted with the more standardized objectives of quantitative analysis, were not clearly stated at this time. If one studies the outline, especially the optional part, one is forced to conclude that at least some of these specialized objectives were sub-consciously recognized at the time by the individuals responsible for it. The outline for the laboratory portion of the course, with the optional parts included, constitute a very satisfactory guide for present-day courses in pharmaceutical analysis if sufficient laboratory time is available for the completion of at least the major portion of it. The didactic outline needs some revision taking into account the

more specialized objectives of pharmaceutical analysis which have been well stated by Blauch and Webster in *The Pharmaceutical Curriculum* and which have been re-emphasized and discussed by preceding speakers to-day.

It is not my purpose here to devote further time to emphasizing the necessity for or the objectives of a required course in pharmaceutical analysis for all pharmacy students. Blauch and Webster in *The Pharmaceutical Curriculum*, a report presented under the auspices of the Committee on Curriculum of the American Association of Colleges of Pharmacy, have discussed and recommended both a course in quantitative analytical chemistry and a course in drug assay. The specialized purposes of each course are clearly defined and the desirability of their inclusion in the curriculum is emphasized. It is to be hoped that as this report receives the wide-spread and careful study that it deserves, some of the misconceptions concerning the intent of the Syllabus Committee with respect to pharmaceutical analysis will be clarified. That the importance of pharmaceutical analysis needs to be stressed is shown by figures included by Deno in a paper entitled *Teaching Patterns in Pharmaceutical Chemistry* presented before the Teachers' Seminar on Pharmaceutical Chemistry in Ann Arbor in 1952. His figures show that although at that time forty-five accredited colleges required courses in both quantitative analysis and drug assay and thirteen more required a combination course with approximately the same time allotment as the sum of the times of the separate courses, there were sixteen accredited colleges which "require no work at all" in drug assay. It seems highly probable that the quantitative analysis required by this last group of sixteen colleges actually included some pharmaceutical analysis, but that it was not so indicated in the college catalogs. At any rate, the time allotted to this area by these sixteen colleges was definitely inadequate.

When one proposes to discuss "what should be done" about a course or a group of courses, he must, in order to make any sense, either know what is going to be or has been done about many other related courses in the curriculum or he

must assume that the related courses will be or have been established according to some definite plan. This is particularly true when the courses under discussion are quantitative chemical analysis and pharmaceutical analysis. Not only does the arrangement of the many related courses have bearing here, but also the general administrative policies of the college exert their influence as well. If the course in quantitative analysis is being taught by a chemist in a university chemistry department entirely separate from the college of pharmacy, there usually isn't very much that can be done about it except to take it or leave it. Such courses are usually rather well standardized and devote themselves to the fundamentals of analytical chemistry without any particular pharmaceutical applications. Under such conditions, it seems to me, that an additional required course in pharmaceutical analysis is mandatory. On the other hand, if all the required analytical work is being taught within the college of pharmacy, either by a chemist or by a pharmaceutical chemist, he may decide, or the decision may be made for him, to teach first the fundamentals and then the pharmaceutical applications, or to coordinate the two into a single continuous course, bringing in the applications and meeting the specialized objectives of pharmaceutical analysis as he develops the fundamentals.

I must admit that I am prejudiced toward the former of these two alternatives. My entire experience, both as a student and as a teacher, has actually been under the conditions first described where the quantitative analysis was taught by a chemist in a separate chemistry department not under the administration of the college of pharmacy. I believe this method of approach is more nearly in accord with the way other sequential courses are being handled by modern curriculum planners. For example, for a number of years in the recent past, the biological scientists pressed for the inclusion of a fundamental course in zoology as a background for the applied courses in pharmacognosy and pharmacology. More recently we find that more fundamentals in physiology and anatomy are being requested for the same purpose. In general, I believe that the applied courses are much more thor-

oughly understood and appreciated by the student if he has previously gained a working knowledge of the principles involved.

However, I realize that circumstances alter situations; and what might seem the best arrangement to me, partly because of my experience with it, might prove unworkable in some of our schools and colleges. I am not one of those who believe that a state of complete uniformity with respect to the curriculum in all of our colleges of pharmacy would be an ideal condition. If the instructor is worth his salt as an educator, his individuality will be apparent in his courses; and this in turn demands some freedom of arrangement of sequences. Sometimes I think we worry too much about making it easy to evaluate the transfer students' credits. Most of our students are not transfer students, in the first place In the second place, if all curricula and instruction were uniform, what would be the incentive to transfer for the student who wished to specialize to some extent during his undergraduate years?

Previously, I mentioned the necessity of having some knowledge of the other parts of the curriculum, if one would adequately discuss the topic assigned to me. Since I have now indicated that it is my belief that individual variations in curricula are not only necessary but advantageous to the student, it becomes obvious that a dogmatic answer to the question posed for me becomes impossible. However, in order to fulfil my obligations on this panel, I felt that I must assume some standardized hypothetical curriculum and then postulate some answers which might fit the assumed conditions.

For guidance in my assumption it seemed logical to turn to the reports of the Committee on Curriculum of the American Association of Colleges of Pharmacy and hence to *The Pharmaceutical Curriculum* by Blauch and Webster. I studied the recommendations of this report for the various courses constituting the recommended curricula, paying particular attention to those courses which logically are pre-requisite to or closely related to quantitative analysis and pharmaceutical analysis. Among others we find the following recommended courses here:

Ten semester hours of general chemistry and qualitative analysis.

Inorganic pharmaceutical chemistry with a modicum of laboratory work.

Organic chemistry, of course.

Physical chemistry with laboratory work, following the appropriate courses in mathematics and physics.

Biochemistry with laboratory work.

Chemistry and Pharmacy of Medicinals.

Having studied the recommended objectives, contents, and time allotments for these courses particularly and for several of the other courses as well, I then asked myself the question, "What should be done about analytical chemistry and pharmaceutical analysis?" Perhaps not so strangely, I came up with about the same answers as were found in the recommendations of the report for the courses in quantitative analytical chemistry and drug assay.

Assuming that the subject matter of the above named courses is adequately presented in such a manner that at least a portion of it will be retained by the student, the requirement of a four semester-hour course in fundamental analytical chemistry and of four semester hours devoted to pharmaceutical analysis seems about right to me. I would caution that the introduction to physico-chemical and instrumental methods of analysis suggested for the analytical chemistry course be no more than a recognition of the importance of these methods, lest the classical methods of gravimetric and volumetric analysis, with their stress upon the proper techniques for precise weighings and measurements, and the appreciation of the quantitative concepts underlying the chemical equation be slighted because of the time allotment for the course. These instrumental methods may be further developed in the course in pharmaceutical analysis, but for a thorough understanding of the applications of, for example the spectrophotometer, polarograph, or oscillometer, to the field of pharmaceutical analysis, more time—preferably an elective undergraduate course and graduate courses in the field—will be necessary.

The recommendations for the course in drug assay is for 32 hours of didactic instruction, which would seem to me to

be the absolute minimum necessary, and for 96 hours of laboratory work. Utilizing four-hour laboratory periods, instead of three-hour periods, this time might profitably be extended to 128 hours.

For objectives and content of these two courses, I will refer you to the report itself. I am in accord with the ideas expressed there.

I must disagree with the elimination of the drug assay course from the 1-plus-4 or 2-plus-3 year plans. A one-semester course in pharmaceutical analysis following quantitative analysis, or the equivalent time devoted to a combined course, seems to me to be an absolute requirement of any pharmacy curriculum. I must confess that I don't know what could be left out in order to include it in these five-year plans, but I think it must be included. It seems strange that drug assay was eliminated here when it was included as a requirement in the straight four-year curricula presented earlier in the report. Of course, it is apparent from the report, that a 2-plus-4 year plan is academically mandatory, and perhaps the elimination of certain courses was the Committee's way of emphasizing this fact.

With respect to the sequential arrangement of these courses, it appears that under any time plan, the first two years must be reserved for general chemistry and qualitative analysis and organic chemistry. This would put quantitative chemistry and physical chemistry in the third year. I think this is where quantitative analysis belongs—probably in the first semester—following mathematics and physics and concurrent with physical chemistry. This arrangement calls for biochemistry in the fourth year and thus pharmaceutical analysis would preferably come in the fifth year, probably the first semester, of any five-year plan. Such a sequence is quite satisfactory with the pharmaceutical analysis following the other chemistry courses and also following all pharmacy preparation and manufacturing courses except dispensing, and being given concurrently with pharmacology and chemistry and pharmacy of medicinals.

In a six-year plan, quantitative analysis would retain its position in the third year and pharmaceutical analysis

might be given in the fifth year if the other chemistry and pharmacy courses, except dispensing, were completed by then. This would allow more time for those students who wished to elect further work in pharmaceutical analysis. However, if some of the other previously mentioned courses were pushed up into the fifth year, then the drug assay course should come the first semester of the sixth year. This would still allow time for the election of one more semester in the field and would probably allow the pharmaceutical analysis to follow chemistry and pharmacy of medicinals, which really should be pre-requisite to it.

I have mentioned from time to time an elective course in pharmaceutical analysis following the required one-semester course. I believe this should be available in most of our schools and should probably be an additional requirement for those pharmacy students who plan to do graduate work in almost any field except possibly those concerned with history of pharmacy or pharmacy administration. I think it should also be required for those students planning to go into production, control, or research in industry and for those planning to continue in the field of hospital pharmacy. In such a course instrumental and physico-chemical methods might well predominate and such fields as vitamin assays, antibiotic assays, micro-biological assays, phenol-coefficient tests, and similar analytical procedures might be incorporated. The necessity for and the problems associated with the establishment of standards of quality for drugs and pharmaceuticals and the importance of these standards to the entire pharmaceutical and medical professions, as well as to the public at large, could be emphasized to a considerably greater extent in the didactic portion of this course.

Although I have used the terms "drug assay" and pharmaceutical analysis" more or less interchangeably during this discussion, I believe that the latter is the preferable designation for this field of work. It denotes both qualitative and quantitative manipulations on all materials of pharmaceutical interest, including among others crude drugs and natural products from all sources, inorganic and organic chemicals,

and pharmaceutical preparations of all types. The term "drug assay" to many of our present pharmaceutical educators brings up unpleasant memories of long hours spent in making ash, moisture, and alkaloidal determinations on crude plant drugs. They sometimes fail to realize that modern courses in pharmaceutical analysis have much broader objectives and cover a much wider field than those courses to which they were exposed a quarter of a century or more ago.

General Objectives in Quantitative Analysis and Drug Assay in the Pharmacy Curriculum*

ARTHUR E. JAMES

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Background

The teaching of any course centers around certain aims and objectives which constitute the ultimate justification for offering the course. Before he can do a thorough job the teacher must ascertain what constitutes the essential aims and objectives of the course in question and then proceed to organize, teach, and examine towards their attainment. During the past two decades considerable thought and energy have been expended in formulating the objectives of the various courses in the pharmaceutical curriculum. Fifteen years ago at the 1938 Conference of Teachers of Chemistry, held in Minneapolis, the present author presented a paper entitled "The Objectives of Quantitative Analysis in the Pharmaceutical Curriculum." Thus, today's paper, in large part, is a re-appraisal and an extension of the objectives which were formulated at that time.[1] Indeed, the former paper

*Prepared as a part of a Symposium conducted by the Section of Teachers of Chemistry at the 1953 meeting in Salt Lake City.

specifically stated that the rapid changes taking place in pharmacy make it imperative that any set of objectives be under continual scrutiny for improvement and revision.

The title of this paper extends the area under consideration to include drug assays. While it may reasonably be assumed that the meaning of the terms *quantitative analysis* and *assay* are generally understood it seems desirable to delineate the connotation of the term *drug*. The meaning of the term as used here is best defined in the words of the United States Food and Drug Act of 1906 as follows: "The term drug. . . . shall include all medicines and preparations recognized in the United States Pharmacopoeia or National Formulary for internal or external use, and any substance or mixture of substances intended to be used for the cure, mitigation, or prevention of disease of either man or other animals."

Prerequisites

As prerequisites for the course in quantitative analysis and drug assay it is assumed that the student shall have completed standard courses in college algebra, trigonometry, general chemistry, qualitative analysis, general physics, general pharmacy, and pharmaceutical products. A course in organic chemistry shall have been completed or it may be taken concurrently. At Temple University it has been found especially effective to have the general principles of the balance taught in the course in physics. In this physics course laboratory work dealing with the principles of the balance is carried out using the same balances which are subsequently used in the quantitative analysis laboratory. This laboratory work is carefully synchronized with the weighing techniques which are later required in the course in quantitative analysis. Thus before entering the latter course the student already has achieved some familiarity with the balance.

Organization

It is not the province of this paper to discuss the particular organization of courses in chemistry as given in the pharmacy curriculum. However, it is assumed that the

objectives for quantitative analysis and drug assay which are set forth in the following paragraphs are equally applicable to those schools which include qualitative analysis as a part of the course in general chemistry. Likewise the objectives presented herewith do not preclude the possibility of combining qualitative and quantitative analysis into one course or combining quantitative analysis and drug assay into a unified course. The University of Michigan School of Pharmacy is currently experimenting with a combined course in quantitative and qualitative analysis[2] while the Massachusetts College of Pharmacy gives a unified course in quantitative analysis and drug assay.[3] Some institutions may prefer to combine the course in drug assay with instrumental methods of analysis.

The objectives formulated in this paper may be achieved by having the prerequisite courses, other than those in pharmacy, given in either a college of pharmacy or in a college of arts and sciences. Furthermore the first course in quantitative analysis as offered in many colleges of arts and sciences may be considered as an acceptable introductory part of the course in quantitative analysis and drug assay.

The Objectives

1. The mastery of essential factual knowledge. (See outline under scope.)

2. A comprehension of quantitative analysis and drug assay as the application of certain principles of chemistry, physics, and physical chemistry for the determination of the quantitative content of materials of importance to pharmacy.

Comment: A study of the limitations of application of these facts, 1, and principles, 2, should constitute the major tissue of the course. For example, in the assay of silver by the Mohr Method the simple chemical facts involved are the insolubility of silver chloride and of silver chromate. In examining the limitations of this assay there must be taken into consideration such factors as the respective solubility products, the pH of the solution, and the presence of foreign ions. Similarly a study of the effects of such other factors as ionization constants, hydrolysis, common ion effect, pH range of indicators, adsorption, occlusion, etc., are of perhaps

greater importance than the simple chemical facts of neutralization, precipitation, or oxidation-reduction. Thus the simple chemical facts are of secondary importance with respect to the feasibility of a particular assay. Whereas only a limited number of chemical reactions are involved in most determinations a very considerable knowledge of the foregoing theoretical aspects are essential in judging the acceptability of a particular assay.

3. The capacity to understand and to interpret the fundamental principles underlying the procedures and methods used in any particular assay. Comment: In the past, all too frequently, pharmacy students have been obliged to become reservoirs of isolated facts without comprehending the general principles which correlate and explain these facts. A knowledge of fundamental principles should make possible the extension or replacement of certain existing methods of assay by more suitable procedures.

4. The development of critical judgment with respect to the introduction of errors at each step, as well as the errors inherent in the method, in any particular assay.

Comment: The continuous consciousness of this attitude is considered to be of paramount importance and to be the very essence of quantitative measurement. This involves, among other things, an awareness of the need of using calibrated apparatus and weights.

5. The development of skills and techniques.

Comment: The replacement of many volumetric and gravimetric techniques by more rapid instrumental methods does not eliminate the necessity for a reasonable emphasis in these areas. These changes, however, introduce the necessity for adding some of the skills and techniques incident to instrumental methods of analysis.

6. The development of the ability to locate, utilize, and interpret the literature of importance in this field.

7. The ability to formulate clear, concise, and complete reports of work carried out in the laboratory.

Comment: No report should be considered complete unless it shows the degree of precision indicated by the proper number of significant figures. In view of the limitations

mentioned in objective 2 it should be apparent to the student that the accurate value (absolute correct value) of an assay can never be obtained. For this reason the precision range of the assay should be given.

8. To develop the ability to deal with the stoichiometric and mathematical aspects of the subject.

Comment: An understanding of the principles listed under objective 2 presupposes this capacity.

The Scope of Quantitative Analysis and Drug Assay

In seeking to achieve the foregoing objectives it appears pertinent to give some indication of the scope to be included in the course under discussion. Although the laboratory part of the course will contain only appropriately selected type illustrations of each of the major divisions in the following outline the didactic part of the course should treat each of the areas listed.*

NEUTRALIZATION METHODS

Acidimetry

Direct Titrations
- Inorganic Acids
- Aliphatic Organic Acids
- Aromatic Organic Acids
- Heterocyclic Organic Acids
- Salts & Esters
- Aldehydes
- Theobromine

Residual Titrations
- Organic Acids
- Phosphates
- Acetates
- Aldehydes

Alkalimetry

Direct Titrations
- Albali Hydroxides
- Other Inorganic Alkaline Materials
- Alkali Salts of Aliphatic Organic Acids (Incinerations)
- Alkali Salts of Aromatic Acids
- Aliphatic Amines

Residual Titrations
- Inorganic Compounds
- Organic Compounds
  - Alkali Salts (Incinerations)
  - Organic Nitrogen Compounds
- Kjeldahl Determination of Nitrogen

*This outline is based upon USP XIV and NF IX.

VOLUMETRIC PRECIPITATION METHODS

Direct Titrations
- Volhard Method for Ag & Hg Cpds
- Argentometirc Methods
  - Mohr Method for Cyanide
  - Fajans Method for Iodide
  - Organic Iodine
- Ferrocyanide Method for Zinc

Residual Titrations
- Volhard Method
  - Halides
  - Thiocyanate
  - Theophylline

GRAVIMETRIC PRECIPITATION METHODS

- Silver Halides
- Barium Sulfate
- Sulfides of Sb & Hg
- Oxides of Al, Bi, Mn, & Zn
- Bismuth as Bismuth Phosphate
- Pyrophosphate Methods for Mg, Mn, & P04
- Oxinate Method for Magnesium
- Miscellaneous Methods

OXIDATION-REDUCTION METHODS

Permanganometry

Direct Titrations
- Peroxides
- Ferrous Iron
- Oxalate Method for Calcium

Residual Titrations
- Oxalate Method for Ca & Pb

Miscellaneous

Permanganimetry
- For Manganese

Cerometry
- Direct Titrations

Iodometry

Direct Titrations
- For Sb, As., etc.

Residual Titrations
- For Hg (ous), Pb., etc.

Iodometry

Direct Titrations
- Thiosulfate Method for Organic Iodine, Available Chlorine, Ferric Iron, etc.

Iodine-Iodide Preparations

Bromometry (Koppescharr's Method For Phenols and Hypophosphites)

Potassium Bromate Method for Arsenic

DIAZOTIZATION METHOD

Direct Titration of Sulfa Drugs with Sodium Nitrite

DETERMINATION OF FUNCTIONAL GROUPS

- Acid Value
- Ester Value for Fats & Esters
- Ester Content
- Saponiflcation Value
- Hydroxyl Value (Number)
- Acetyl Value
- Alcohol Content
- Iodine Value
- Methoxyl Group
- Phenolic Content
- Aldehyde & Ketone Content

MOISTURE DETERMINATION

Loss on Heating
Toluene Extraction
Karl Fischer Titration

GRAVIMETRIC IGNITION OR EVAPORATION
EXTRACTION METHODS

Evaporation of Solvent Followed By Weiging Extractive
Drying and Weighing of Residue

Solvents	Water
Ether	Petroleum Ether
Alcohol	Chloroform
Diluted Alcohol	

Evaporation of Solvent Followed by Residual Titration of Residue
Proximate Assay of Alkaloids

HYDROGEN ION MEASUREMENT

Colorimetric
Potentiometric

MISCELLANEOUS METHODS

Crude Fiber
Non-Saponifiable Matter
Ash-Total and Acid Insoluble

INSTRUMENTAL METHODS

Colorimetric	Polarimetric
Turbidimetric	Refractimetric
Spectrophotometric	Viscosimetric
Fluorimetric	Gasometric

ENZYMATIC ACTIVITY

Digestion of Substrate

NON-OFFICIAL METHODS

Electrolytic Deposition	Ion-Exchange
Electrometric Titrations	Polarography
Nonaqueous Titrations	Spectometry
Chromatography	

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The Importance of Drug Assay Courses to Pharmacists in Retail and Hospital Practice*

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As this paper is presented before the Section of Teachers of Chemistry, it is presumed by the writer that "drug assay courses" refers to chemical assays only. However, I have taken the liberty to include biological assays in my remarks.

In the retail practice of pharmacy today, pharmaceutical manufacturing is a thing of the past except perhaps for aromatic waters and a few other equally simple preparations not requiring standardization and not generally available from the pharmaceutical manufacturer. On the other hand, pharmacists in hospitals—even the very smallest—usually engage in a program of pharmaceutical manufacturing if the volume of a preparation used justifies its manufacture from the viewpoint of economy. Non-profit and governmental hospitals enjoy the privilege of using tax-free ethyl alcohol and therefore pharmaceuticals containing alcohol are nearly always prepared in the hospital. Substantial savings are effected by the hospital pharmacist through his manufacture of spirits, elixirs and other alcohol-containing pharmaceuticals. Even though assays are provided by the USP and NF for many of these products, the hospital pharmacist feels, perhaps in error, that assays are unnecessary. A check on every assayable product is highly desirable but the cost of this operation for the relatively small batches prepared in the hospital pharmacy would warrant discontinuance of manufacturing in most cases. The situation in the hospital pharmacy is not at all analogous to that in the large manufacturing plant where rigid controls are essential. In the large pharmaceutical manufacturing house, a single preparation passes through many hands between the weighing or measuring of ingred-

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ients and the end of the finishing line, and there are numerous opportunities for an error to occur. Conversely, in the hospital pharmacy, strict controls are not as important because, as a rule, only one pharmacist is responsible for a preparation from start to finish and the danger of error is at a minimum. A second pharmacist, if available, may check weights and measurements but this is frequently not possible since the majority of hospitals having pharmacies employ only one pharmacist. It appears therefore that any benefits derived from drug assay courses by retail and hospital pharmacists will be indirect.

What are these indirect benefits?

Assay courses make the student aware of quality in drugs and chemicals. He learns that technical grades of chemicals are generally not suited for medicinal purposes. He learns that the official or medicinal grades may contain small quantities of inert impurities which do not detract from their medicinal qualities but usually render them unsuitable for analytical purposes. He also learns that reagent grades of chemicals, while acceptable for medicinal purposes, are not used medicinally because of their higher cost.

Schools of pharmacy have frequently been accused of devoting too little attention to the study of the stability, or rather instability, of certain drugs and preparations. The same is true with regard to the study of the proper storage of drugs, chemicals and pharmaceuticals in an effort to prevent or retard deterioration. Drug assay courses serve well to emphasize instability and correct storage.

It is unfortunate that we must recognize that all pharmaceutical manufacturers do not operate under the same standard of ethics. We must recognize that there are top-notch houses and then there are some in which pharmaceuticals are mixed in the kitchen sink. The pharmacy student well grounded in manufacturing control procedures becomes aware of the differences in the quality and integrity of manufacturers and accordingly becomes cautious in his purchasing of pharmaceutical supplies.

The course in biological assaying affords the student a first hand opportunity to observe the effects of certain drugs

on experimental animals. Through this medium, the student gains a better knowledge of pharmacology and in turn becomes a better pharmacist who is better equipped to discuss drug actions with physicians when called upon for information.

Numerous surveys have been made on the degree of accuracy attained in prescription compounding by representative groups of pharmacists. Prescriptions for hand-filled capsules, extemporaneous ointments or for simple solutions of specified strengths have been presented in retail drug stores and filled by pharmacists in the belief that the medications were for human consumption. Each product was later assayed and many of the findings were shocking. Results of these studies have driven home the need for greater care and precision in compounding. Courses in quantitative chemistry serve well to train the student of pharmacy in precision techniques and also impress him with the need for accuracy.

Even though the hospital pharmacist may make only an occasional quantitative determination and the retail pharmacist may never run an assay, courses in analytical procedures are very important in the education of the pharmacist.

The Importance of Drug Assay Courses to Pharmacists in Industry*

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Introduction

This subject can be examined from two different viewpoints. One aspect would be to explore the question "Is training in drug assay important to the pharmacists in industry,

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and, if so, why?" If we looked at the subject entirely from this viewpoint, I believe I could present nothing but an organized rehash of the obvious importance of drug assays, and, in fact, all assays in industry.

Another aspect would be to explore the question "Just how important is analysis, both chemical and physical, to the pharmaceutical industry?" and, assuming this to be of sufficient importance, "What does industry require of the pharmaceutical analyst with respect to technical skill and technical background, and with respect to personality and the skill of human relations?" I prefer the latter viewpoint because it better allows us to probe into the factors which determine the success or failure of the pharmaceutical analyst in industry.

So, as you can see, I have broadened the subject by expanding drug assays which, I understand, is the art of analysis of official drugs, to encompass all analyses of importance to the pharmaceutical industry. With that in mind, I am going to discuss just how the type of analysis known as "control" fits into the organizational pattern of a typical pharmaceutical company. Next I will present my ideas of what the pharmaceutical analyst should know and what he should be able to learn.

Industrial Organization

In the drug industry, pharmaceutical control commonly fits into the organizational structure in three different places: Incoming Control, In Process Control, and Final Product Control.

Incoming Control

The first is concerned with the inspection and analysis of incoming material. This is sometimes known as "Incoming Control." The authority for Incoming Control is generally given almost entirely to the Production Department. I say "almost entirely" because there is a sort of fuzzy region where the responsibility of Incoming Control and Final Products Control overlap. This is where the safety of a final product might depend on the purity or freedom from adulteration of

an incoming material when this freedom from adulteration cannot be established for technical reasons in the final product. For example, gelatin to be added eventually to a parenteral product can be so contaminated that, even though it is later rendered sterile, it can produce reactions in sensitive patients. The fit between the bottle and the stopper is so important to the safety of injectibles that the control of this type of incoming material is often assumed by the Final Product Control.

In Process Control

The second place where pharmaceutical control fits into the organization is in In Process Control and this again is invariably the responsibility of the Production Department. In Process Control is becoming more and more important and it is a function which calls for a high degree of ingenuity. Just consider the situation where a thirty or forty thousand dollar batch of a protein hydrolysate stops. Equipment stands idle, possibly some personnel stand idle, and the batch gets more pyrogenic by the minute, while some poor analyst determines if the content of methionine is just right. It happens every day. This In Process Control, though generally the sole responsibility of the Production Department, is sometimes rightfully invaded by the Final Product Control. Certainly, the safety of the final product cannot always be established by analysis or testing of the final product alone.

Final Product Control

We finally come to Final Product Control which, hereafter, I am going to call just plain "Control" because that is what it is. Having complete responsibility, and even a certain amount of legally constituted responsibility, for the safety of the products which are sold, it is in a position to control the whole plant. Whether or not it does this wisely depends on the people in it.

The Nature of Pharmaceutical Control

I am now going to discuss what the pharmaceutical graduate faces when he enters a career in control in the pharmaceutical industry, what he is expected to know, and what he is

expected to be able to learn. In general, this all concerns not what he is expected to know, but what he will be confronted with and what he should be able to cope with. Industry does not expect to receive a graduate who knows the answers but does expect the graduate to know what should be answered and how to arrive at the answer. The ability to size up a situation and to evolve a workable and efficient means of control is all important, and the same situation faces every man in Control from the Director down to the new graduate.

Incoming Control

Today most incoming material when specified or labelled as USP or as a certain grade of USP, or as CP, or AR, will conform to those specifications. I believe that most Incoming Materials Control Departments do not bother to verify the purity of ingredients bearing the USP labels, for example, except for spot checking or except when particularly large sums of money are involved. But many incoming materials have no official standards, or certain criteria are involved which are not covered, and should not be covered, by USP or other standards. Here is where the chief problem lies. This requires the setting of arbitrary standards by Control, or by a Specifications Department, after thorough consultation with Production and Research. This action requires much judgment and a well considered compromise between what is desirable and what is practical.

The heavy metals content of sodium chloride must often be far below the USP tolerance and efficient routine methods must be devised for the determination. The levulose content of dextrose or, lately, the dextrose content of levulose must sometimes be controlled to a tenth of one per cent. I know of one laboratory which is currently controlling the dextrose content of levulose by paper chromatography on a routine basis. Some incoming materials must be controlled for moisture, generally by the Abderhalden technic because of the precision and speed which this method allows. Many incoming materials must be controlled for pyrogen and such diverse examples can be given as dextrose, gelatin, sodium

chloride, sodium acetate, filter aids of all sorts, filter paper, and even rubber or a plastic tubing.

An incoming material which was a major headache fifteen years ago is glass. But, if glass was a problem fifteen years ago, rubber is twice as bad a problem today. Rubber is just the doggonest non-uniform mixture of unidentifiable materials that I have ever encountered. Also, it reacts differently with every different thing you put in a bottle. The rubber problem is a real challenge to the ingenuity of the pharmaceutical analyst.

A very important function of Incoming Control is the examination of chemical aids, accessories, or appliances. Cotton or gauze, needles, seals, stoppers, and bottles are only a few examples. In the assembly for many parenteral solutions, every individual stopper must be tested for size and taper. So must the size and taper of each bottle opening be tested. It is no good to control the stopper if you do not control the hole.

Of course, the application of statistics is important in all analyses today, but I cannot think of a place in the pharmaceutical industry, with the possible exception of the pharmacology laboratory, where statistics are more important than in Incoming Control. The factorial method of statistical analysis is often particularly applicable to Incoming Control because the variation encountered serves to fix the number of samples tested. As I pointed out earlier, the pharmaceutical analyst cannot be expected to know everything about anything, or anything about everything, but he must know what most everything is all about, where to find more information, when to use it, and how to use it. That certainly applies to statistics as well as to anything else.

In Process Control

In Process Control can, of course, mean everything from taking a pH or a temperature reading to running methionine, and a Control Department often has jurisdiction over all of these. But we are more interested in the function requiring analysis. It is common practice for several thousand gallons of parenteral solution to be held in a non-sterile, and

therefore a biologically unstable state, while certain ingredients are measured quantitatively. Procaine solution is an example where, for a quick but accurate check, the USP assay must be dispensed with and the procaine determined by a colorimetric reaction. Glutamic acid can be approximated very rapidly by a colorimetric reaction on specially prepared indicator paper. We have the problem of determining the fibrinogen content of a solution before filling, when fibrinogen is stable under these conditions for only about four hours. Quick analyses must be made for almost all common pharmaceutical ingredients in tablets before the rest of the batch is tableted.

In the manufacture of penicillin and other antibiotics, the purity of the antibiotic in question must be controlled during the production process, because this process generally requires the separation of the antibiotic from a number of closely related compounds or other antibiotics. This is true in the production of streptomycin or bacitracin or penicillin. In the manufacture of penicillin, the penicillin G content is often controlled from the fermentation step on through by a rapid paper chromotography.

Final Product Control

Before we discuss Final Product Control, and since Final Product Control generally has control over just about every technical aspect of the company, except research, let us take a brief look at what the drug industry is and how it is changing.

The ethical drug industry consists of 1300 companies. Fourteen of these companies do over 50% of the business. The ethical drug industry alone now accounts for 6% of the total industry sales in the United States. Sales by the ethical drug industry have increased four-fold in the last ten years. Fifty-four per cent of the total sales is represented by the following products introduced within the last ten years: antibiotics, antihistimines, cortisone and ACTH, and blood derivitives. Eighteen per cent of the industry sales is represented by products introduced during the last two years.

So we can predict this about the pharmaceutical analyst entering the ethical segment of the drug industry. He may work in any of 1300 companies, and there is a 50-50 chance that he will work in one of 14 companies. He will have opportunities and a good future because his industry is growing almost twice as fast as the average American industry. During his first ten year period he will have to develop and apply as much new analytical knowledge as was available to him when he started. I believe this means that a broad foundation with personal flexibility is more important than perfection in detail.

The pharmaceutical analyst in Control is a member of a group which has to be familiar with every technical detail of the company's production operations and with every technical detail of the latter stages of the company's research operations, and we have seen how these operations change, apparently at an even accelerating pace. Now, a little more specifically, what will he be faced with?

For one, he will be faced with the analytical methods of the USP, the NF, the NNR, or the AOAC. Of course, he should be familiar with many of these and should know how to become familiar with the rest, and he undoubtedly will know this. That is fairly easy; it is all worked out; but there are two common difficulties: he cannot always use these methods, and changes in products and standards are generally ahead of the changes in the official compendia.

The official methods are designed primarily for official purposes, but that does not necessarily make each of them the best method for final product control in a pharmaceutical manufacturing plant, and this is in no way a criticism of the official methods. In many cases, the analyst has to go beyond the official methods and, in some cases, can safely dispense with official methods.

One example is the control of procaine hydrochloride injections. The USP standards and assay methods are not concerned with the extent of decomposition of procaine during heat sterilization of a procaine solution and rightfully so, because the decomposition is not enough to affect the proper dos-

age. But the control analyst, unlike the prescription pharmacist, must be concerned with the potency and appearance of his products after they stand two or three years on the shelf. A minute amount of decomposition of procaine today will cause an objectionable color to develop in the solution two or three years later, so that methods which go far beyond the official methods must in this case be employed.

A similar example is the control of particulate matter in parenteral solutions. In all the thousands of pages which have been written about how to define and how to measure the allowable amount of particulate matter in parenteral solutions, I don't believe that anybody has pointed out that the manufacturers do not make solutions containing particles. The particles form there later by gradual reaction between uncontrollable impurities and the glass, the rubber, etc. I said "uncontrollable impurities" deliberately; they are uncontrollable at the present time; and therefore the control analyst must devise methods for detecting if a parenteral solution will form particles in one or two years of storage. To a large extent, that can be done by very refined tyndallimetric technics.

A system of control must be maintained whereby any possible contaminations or accidental substitution of one ingredient for another will be detected. This requires a constant surveillance of procedures used from the Receiving Department on down. A parenteral solution has been known to consist of hand lotion; the alcohol in an elixir has turned out to be acetone; a sulfa drug once turned out to be a barbiturate. Colorless liquids and white powders can be adulterated accidentally where you least expect it and, speaking of where you least expect it, after the raw materials are carefully controlled, the processing and the compounding are almost perfectly controlled and you have the final product in perfect form, meeting all of the specifications, and then somebody puts the wrong label on it. It happens very easily and it has happened everywhere. And that is why Control, in spite of all the pressures for speed, has to politely insist on waiting until the whole batch is labelled before it draws its samples and makes its tests.

I haven't said very much about the particular technics and skills which the future pharmaceutical analyst should possess. I am sure you are familiar with more of them than I am, but I would like to emphasize that the therapeutic technology of our industry keeps changing. It challenges one to guess what is going to come next. We have seen the era of botanical drugs diminish somewhat in relative proportions; we are undoubtedly in the era of synthetics but probably that too is diminishing. I personally believe that we are entering again an era of drugs of natural origin. Drugs which we do not yet have the skill to synthesize and, with the exception of the antibiotics and cortisone, those seem to be more and more proteins, or at least macromolecules. Virus vaccines are purified and modified proteins. Dextran is a macromolecule which must be handled and controlled like a protein. ACTH is a protein, gamma globulin and serum albumin, trypsin, fibrinogen, and prothrombin, the newest specifics are all proteins. Possibly the next era will be an era of proteins. If so, the era will require a pharmaceutical analyst well able to perfect himself in the technics of the analysis of proteins. Now, obviously, I would not recommend that a pharmaceutical student be pushed into a one or two year study of biophysics just to become proficient in the control of macromolecular substances, but I really will recommend that the student have an opportunity to become familiar enough with the methods for characterization of proteins so that he at least can recognize the methods and know the principles on which they are based.

This is no blue sky prophesying. The control of proteins or other macromolecules may not be the most important type of control in the future, but I can assure you that today the pharmaceutical products requiring this type of analysis account for at least a twenty-four million dollar annual business, and these types of analyses were unknown in the industry ten years ago. These products are routinely controlled today by such methods as:

1. The sedimentation constant in the ultracentrifuge.
2. Electrophoretic mobility.

3. Electrophoresis convection, which has been introduced in the past year since a commercially available instrument was introduced,

4. Paper electrophoresis, which is particuarly convenient for the rapid and concise control of the contamination of protein by protein,

5. Paper chromotography, which is paritcularly convenient for the control of the purity of low molecular weight proteins, amino acids and antibiotics,

6. Light scattering, which today is indispensable for the control of molecular weight distribution of dextran, PVP, gelatin, and other substances.

This all means that the pharmaceutical analyst must be familiar not only with the currently official methods for official drugs, or with the detection of micro amounts of trace metals, or with the various complex bio-assays and microbiological assays, but he apparently must now become familiar also with the biophysical measurements which heretofore have been known only to the physical academic theorist.

A Symposium and Seminar

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Wayne University has recently added a course in Prescription Seminar to its Pharmacy curriculum. This course is open to students of senior standing in the College and has for its principal objective the discussion of prescriptions of various types which offer special problems, the presentation of information concerning new drug products which are currently being placed upon the market, and the discussion of new problems or legislation which affect the compounding or dispensing of prescriptions. The objectives as outlined for

*Read before the section of Teachers of Pharmacy at the 1953 meeting in Salt Lake City.

this course are probably very much like those for similar courses in other schools; however, the manner in which the material is presented is an innovation.

The introduction of this course occurred as part of the revision of the entire curriculum of the College of Pharmacy at Wayne University when an attempt was made to thoroughly modernize the course of study and to integrate its four major fields both vertically and horizontally. While the curriculum is not perfect and it is impossible to offer all of the desired courses of study under the limited time afforded by the present four year schedule it appears to be a step in the right direction. The Prescription Seminar was introduced as a climax course, coming in the senior year when the student has sufficient background in basic and cognate subjects so that he is prepared to receive information on and ask intelligent questions pertaining to current and new prescription materials and practices.

Professional ethics are stressed throughout the course. At the beginning of the semester, the Code of Ethics of the American Pharmaceutical Association is read in the class and discussed section by section, with particular attention to application in this vicinity. Special emphasis is placed upon the relationship of the pharmacist to the community, and the opportunities open to him as a leader and as a public health servant.

The presentation of information concerning new drug products which are being placed upon the market currently posed somewhat of a problem. As the new drugs appeared, samples and literature concerning them were assigned to the various students who would review the literature, and present the material at the next class session. Five to ten minutes were allowed for each drug. While this method proved fairly satisfactory it was found that the student in most instances did not have sufficient specialized training to answer questions that might come from the floor and, also, he had no way of knowing the relative importance of any given drug either from the standpoint of the quantity marketed and used, or its potential possibilities. Where could this information be secured?

The fact that Wayne University is located in Detroit, a large city, which has pharmaceutical manufacturers as well as chemical manufacturers in the environs made it seem to be favorably situated in order to utilize the trained men in these industries if their cooperation could be enlisted. Accordingly, the matter was discussed with the sales and service representatives of several large firms. It was proposed that their sales representatives bring their new prescription specialities to the class, giving whatever information that they deemed pertinent about them, followed by a question and answer period. The manufacturers were very willing to cooperate, and considering that there are some two hundred service representatives who reside in Detroit, representing the various pharmaceutical and allied firms, it seemed probable that a program could be set up so that it would not be burdensome to any one individual or group. Accordingly, a schedule was lined up featuring one representative at each weekly session of the class. At this point, the course took on the aspects of a symposium rather than a seminar. Some representatives brought samples of their products and gave detailed information concerning them as to chemical structure and therapeutic uses, some brought sound films showing processes of manufacture, control, packaging and distribution; others, chose a topic such as "Epilepsy" and after discussing the disease would present their particular drug product intended for use in this condition, perhaps contrasting it to other similar preparations on the market.

These sales representatives were not limited to those from strictly pharmaceutical houses alone, but were drawn from manufacturers of instruments and bedside appliances which are sold in the professional pharmacy. Thus an attempt was made to familiarize the student with appliances which he might be selling but upon which he had had no formal instruction.

Several times during the year, the class was taken for visits to firms which manufactured or displayed items which might be of special interest to the retail pharmacist. One such trip was to a company specializing in sick room supplies

and surgical instruments; another, to see the operation of special types of capsulating machinery.

In order to give the student active participation in the course special duties were assigned. A chairman was appointed for each class session whose duty it was to preside over the meeting, secure information concerning the speaker for the day and properly introduce him, conduct the question and answer period, and close the class session. Two students were assigned each week to plan and put up a bulletin board of professional character in the College corridor. These posted materials varied from strictly professional subjects to those of more general interest to the laymen, and to a few which were seasonal in nature.

Another innovation introduced into the course through the ideas and efforts of Dean Roland T. Lakey was the use of the tape recorder. Dean Lakey brought to the class recordings of speeches of national interest from a pharmaceutical standpoint, for example addresses presented at the Centennial Convention in Philadelphia in 1952 were transcribed. In addition, he brought recordings of prescriptions as they were actually received by telephone in drugstores. These were transcribed by the students and discussed in class. Since these recordings were made with the cooperation of several professional retail pharmacies in Detroit the student was given an insight into the types of medication being prescribed locally, as well as a chance to transcribe prescriptions dictated by physicians themselves.

A member of the Michigan State Board of Pharmacy addressed the group, telling them the qualities which the Board looked for and expected to find in candidates. A personnel manager for a large drug store chain spoke, acquainting the group with the job opportunities available, the possible remuneration, the characteristics and qualities which management is seeking in its personnel.

To summarize, we are striving in our Dispensing Seminar to instill a sense of professional ethics in the student, to give him specialized product information, and to give him an opportunity to discuss special prescription problems. In addition, we feel that the contact between students and the

representatives of the various phases of the drug industry makes for good public relations which are of greater importance over a period of years than is any specialized bit of information. The student stops thinking of himself as an isolated individual and sees himself oriented as an integral part of the pharmaceutical industry. Thus, the use of the symposium as a means of presenting product information and special problems to senior students in Dispensing has proved an effective method, one which is enthusiastically received by the student, and one which is receiving the interest and cooperation of the service representatives of the various pharmaceutical and allied manufacturers.

A Functional Course in Dispensing Pharmacy

EARL P. GUTH

Professor of Pharmacy
The Ohio State University

Since the course in Dispensing Pharmacy is considered by most pharmaceutical educators as the peak course in the pharmaceutical curriculum, it is axiomatic that this course should be so constituted as to bring together all of the work taken by the student in other courses. A course in Dispensing Pharmacy is therefore not primarily intended to give a student new information but is intended to show the student how to use and correlate the basic information gained in all other courses. This function of correlation and coordination must be done so as to make the student's education meaningful and practical.

*Read before the section of Teachers of Pharmacy at the 1953 meeting in Salt Lake City.

Some teachers of Dispensing Phermacy have expressed the view that it is not possible for these objectives to be fully gained in colleges of pharmacy. That apprenticeship in a pharmacy is a better means of training a dispensing pharmacist is based upon the fact that in a pharmacy there is no "make believe" atmosphere such as in a college laboratory. The apprentice would be fully cognizant of the fact that every act of his would effect the welfare of other persons; therefore, he would be more conscientious in his endeavors. As valid as this argument is, it must be recognized that at the present time it is impossible to expect students to get the type of training that they need only by the apprenticeship method. There are not enough pharmacies doing a large enough prescription volume to give a student broad and intensive experience, and even if there were, it is doubtful if many of these pharmacies would be interested in taking the time to give apprentices adequate supervision and to repeat this process of training with new students. A pharmacy would expect to get considerable return from an apprentice in order to justify the salary paid the apprentice or the time spent by the supervisor.

Practical experience in a pharmacy is generally recognized as being a prerequisite to licensure, but the average employer expects the apprentice to be able and willing to accept responsibility and to use judgment—and this requirement is based on the student's formal education. Therefore, it is the responsibility of the college to prepare the student as thoroughly as possible for his professional career. As time goes on, it appears as if the colleges will be expected to take a greater responsibility in the student's training and not less.

It is in the course of Dispensing Pharmacy where the opportunities exist to do a better job of getting the student ready for his professional activities. At the 1944 meeting of this Association I reported on a method of teaching dispensing pharmacy (Journal of Pharmaceutical Education, April, 1945, pp. 216-222) that was inaugurated at The Ohio State University in 1942. At that time the College was on a four-year accelerated program. The program in Dispens-

ing at that time worked very well under acceleration as it was possible to start students in Dispensing during any quarter. This eliminated the necessity of repeating each course each quarter. However, it was observed that there were certain inadequacies—the chief one being the lack of pharmacology, since this course was taken concurrently.

With the change over to a five-year program (two years of pre-pharmacy; 3 years professional program), it was possible to rearrange all professional courses and to enlarge the offering in every area. Additional hours in dispensing were made available. Pharmacology was given during the second year of the professional curriculum with Dispensing in the last year. This also made it possible to inaugurate a new course covering certain physical-chemical phenomena important to dispensing. (This material had previously been given in the first quarter of Dispensing.)

The Dispensing course as now constituted is a three quarter sequence of five credits each quarter (three one-hour lectures and recitations and two three-hour laboratory periods each week). The first two quarters are required and the third quarter is elective. Throughout the first and second quarters each student is assigned individual problem prescriptions, usually two at a time. The assignment of prescriptions to each student is done in such a manner as to give him a wide variety of experiences and every attempt is made to keep each student on different prescriptions during any laboratory period. Neither the student nor the instructor has any definite idea as to the nature of the prescription issued to each student. The issue of prescriptions is determined at the time the student asks for more prescriptions. This creates, to a degree, an atmosphere comparable to a drug store, since in a drug store the pharmacist has no idea of the nature of the prescription a customer will present until he receives it.

During the first quarter emphasis is placed on the compounding of problem prescriptions. Every known type of problem is presented. During the second quarter the student continues to receive problem prescriptions, but in addition he must evaluate the pharmacology of the ingredients. This

is made possible by stating the purpose for which the prescription is to be used. Filing, registering, pricing, etc., of the prescriptions are also performed.

Throughout the entire two quarters the same general policies of instruction are maintained. A student must compound each prescription in a satisfactory manner and be able to answer any question that is suggested by the prescription. This makes it possible to correlate all of the student's previous training. Questions involving pharmacy, chemistry, pharmacology, pharmacognosy, jurisprudence, bacteriology, etc., are in order. This procedure causes the student to refer to the literature and reference material. He learns to interpret, objectively, information that he once learned more or less empirically. He soon adjusts himself to the challenge set up by this system and develops a confidence in his own ability not generally accomplished by students in Dispensing. No great emphasis is placed on the number of prescriptions filled, but experience with this type of instruction has shown that the average student will compound thirty prescriptions during an eleven-week quarter. The lectures are devoted to the discussion of types of general professional need and interest. Recitations are held weekly where the student gives a short report on some topic of current interest to dispensing and professional promotion. This type of training is essential to give the student confidence in his ability to read professional literature and to relay the information to others. It also helps him to appreciate the importance of reading as a necessary means of keeping abreast of professional activity.

The course as outlined requires a well-stocked laboratory with adequate equipment since the student is expected to function as if he were in a drug store. He is held responsible for the condition of the stock the same as if he were in a store. This course also requires an adequate staff—adequate not only in numbers of instructors, but adequate in training and ability. The instructor including the assistants must be well-rounded individuals. Sections must be kept within reasonable limits of size. We have found twenty-one

students with one instructor and two assistants to work fairly well.

The third quarter of dispensing is elective. This period is devoted to product development. Students are placed in teams of three and each team is given a series of projects. Each team has different projects. These projects are usually stated in a general manner such as "make a koalin-pectin suspension for the treatment of diarrhea," or the project may only state the active ingredients of a formula for an hematinic. Besides developing a satisfactory preparation, the students must prepare a statement containing therapeutic claims and cautions. This latter adventure in teaching Dispensing Pharmacy has exceeded our original estimation. Several papers given before the Practical Pharmacy Section were prepared from the work done in this course, but more encouraging than the publishing of papers has been the experiences of recent graduates. Some of the young men were given the opportunity to put into practice the principles given them in college. They have found them to be practical and productive of good interprofessional relations. Some of these young men have made phenomenal professional advances in a short time.

We feel that the type of training students receive in Dispensing Pharmacy while in College is intimately associated with this professional success. It must be emphasized here, however, that the kind of dispensing series given at The Ohio State University would not be possible were it not for a five-year program with its sound background of basic courses, the expanded offerings in all areas of the curriculum, and staffed throughout with a faculty that is fully conscious of the educational needs of modern pharmacists.

Points for Emphasis in the Teaching of Dispensing Pharmacy

JEAN BROWN

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University of Oklahoma

It is my understanding that the object of our Teachers' Council Section is "to study and encourage means for the advancement of the teaching of Pharmacy courses," and to present briefly any ideas or new techniques employed by members of the various faculties.

While my ideas and techniques may not be particularly new it is my purpose to outline briefly the points emphasized and found effective in presenting the two four hour Senior courses in dispensing at the University of Oklahoma.

It has been constantly a surprise to me in reading and in talking with teachers in this particular area to find their ideas and methods are very much alike. Possibly this is due to the fact that most of us have had a background of practical experience which makes us aware of what we must do to produce competent pharmacists. However, while we may have the same general purposes in mind there is no doubt but that we have differences of opinion as to the points that should be emphasized and the methods we like to think most effective.

There are two very important things to be considered before anything can be accomplished in dispensing. Number one, the prescriptions studied and filled should be as nearly as possible the same type as those the student will receive when he starts actual practice. In other words, they must be taken, principally, from the current files of drug stores, prescription shops and hospitals. In order to accomplish this each member of the second semester class is required to hand in two dispensed and two compounded prescriptions for each week of the semester. This makes a total of sixty-four prescriptions per student which he accumulates from active

*Read before the section of Teachers of Pharmacy at the 1953 meeting in Salt Lake City.

files over the state. This also gives the student an opportunity and incentive to visit and acquaint himself with the pharmacists and their prescription departments. These prescriptions are filed and used for either study or actual compounding.

Number two: It is most important to have as nearly as possible a perfect correlation between our lectures and laboratories as well as with other courses in the curriculum. This, as we all know, requires time and hard work. I believe in concentrated emphasis in the laboratory. Without actual experience under complete supervision all effort in the teaching of techniques results in failure.

The three major points for emphasis in the teaching of dispensing pharmacy are to me 1) accuracy, 2) neatness, 3) speed or dispatch. We will probably all agree that accuracy is the most important of the three but I am convinced that accuracy cannot be accomplished without the other two.

In teaching compounding, however, it seems necessary at first to combine accuracy with neatness regardless of the time required to fill the prescription. Then it is fairly easy to prove to each individual student, by his actual experience, that dispatch follows automatically.

In developing accuracy in a student it is a mistake to let him think of it in terms of only correct weighing and measuring. To present a complete accuracy picture we should consider the following nine points as essential: 1) accuracy in recording the prescription taken over the telephone; 2) proper reading and interpretation of the prescription; 3) checking the dosages; 4) selection of proper ingredients; 5) accurate weighing and measuring; 6) order of mixing; 7) special techniques to be used; 8) proper packaging; 9) accurate labeling.

The first is very important and a frequent source of error in actual prescription practice. We have telephones in the laboratory which are used during the period. However, the feasibility of too many interruptions, especially during the first semester, is questionable. In order to improve the student's ability to record prescriptions correctly and to supplement the telephone training they are required to meet in

the class-room before going into the laboratory. At this time they take down the prescriptions, usually six, that are to be filled during the period. These are given, even at the beginning of the first semester, at a rather rapid rate. Of course, it is difficult for them to follow but they take down what they can as rapidly and accurately as possible without interrupting for questions. Then the prescriptions are repeated as many times as necessary for completion and correction of errors. The progress is amazing. By the end of the second semester they are recording with accuracy and as fast as the prescription is read or as fast as the doctor would ordinarily talk over the phone. I do not believe this training can be accomplished by handing the student a typewritten list of prescriptions before the laboratory period begins.

After the prescriptions are recorded we have a question and answer period. However, the student is supposed to be able to answer most of the questions himself if he has done the reading previously assigned over the material to be covered. I believe this is better than to give him the prescriptions for study, in advance. It requires quick thinking and use of the knowledge he has gained through previous study and develops self-confidence in the analysis of the prescription. It lessons the feeling he must rush for a book rather than use the knowledge he has accumulated. Here, it is necessary to impress upon him the fine line that exists between overconfidence and the right amount. The questions asked at this time by the instructor should help prepare the student for that time when he will have to do a quick analysis under pressure at the prescription counter.

The next two of the nine points are more or less routine but nevertheless important. The proper reading of the prescription requires the use of all the previous knowledge acquired in the other courses of the curriculum and therefore demands a careful correlation of courses to assure sufficient training and background.

Some believe that pharmacists should not trust their memory for dosages, to a great extent. However, it is evident that they cannot refer to a book each time they fill a prescription. The student should be so familiar with dosages

that any overdose on a prescription immediately will raise a question in his mind. If we train our students properly most dosages become so familiar to them that it takes only a few minutes of study of the prescription to identify discrepancies of this type. The first semester my students are required to learn all the official doses over one grain and the second semester all under and including one grain. At the end of the two semesters they have, by constant repetition, attained a fairly complete knowledge of posology. Again it is important to warn them against overconfidence.

The fourth point is selection of proper ingredients and most students are well trained in this area which is usually emphasized by most teachers of dispensing. It, of course, includes careful checking of the labels on the containers. It should include observing the prescriber's desires in the specification of the brand of his choice with no substitution.

Also the student should be made to realize that the selection of the proper ingredient by reading and checking the labels does not entirely rule out the possibility of an error. The student of Pharmacy, as well as the experienced pharmacist, has a good knowledge of the physical and chemical properties of the substances used in prescriptions. This knowledge should always be alerted and any suspicion of error caused by the use of the senses, taste, odor, sight or touch, should be clarified by chemical tests for identification or by discarding the substance under suspicion.

To check my students on chemistry and selection of proper ingredients I use prescriptions such as the following:

Rx Urotropin —
Sodium acid prosphate aa gr.V
M. ft. chart. D.T.D. No. 15

Last semester both the mono-basic sodium phosphate and the di-basic sodium phosphate were placed on the dispensing counter. Later the prescriptions were checked chemically and the group average of error was 34%. Some weeks later this same prescription was included in a laboratory test and only one out of forty-five students chose the wrong chemical or the di-basic salt.

Weighing and measuring is perhaps the most important point in the accuracy picture. We naturally expect the student

to be more or less skilled in this by the time he reaches the courses in dispensing. Proper equipment is a must but without strictness and supervision the equipment is a lost investment and it requires hard work to emphasize this type of accuracy. There is, as we all know, a tendency for the student to be careless unless he is regularly checked. To correct this in our laboratory a prescription is selected weekly from each student's preparations and checked for accuracy and then an accuracy chart is compiled which contains the percentage of error for each student on this particular prescription.

This chart is posted in the laboratory with the percentage of error opposite each student's name. This stimulates a spirit of competition and pride which helps develop the best in each individual and promotes a definite feeling of responsibility. He realizes that any one of the prescriptions he fills may be taken from his desk and checked and that his percentage of error will be posted for comparison. It is gratifying to both the student and the teacher to observe the percentage of error decreasing, materially, with more experience and training.

The next point, or order of mixing, usually enters into the picture as a procedure used in preventing incompatabilities. However, it should be taught routinely to produce greater accuracy in mixing and dividing dosages. Let us consider the following prescription:

Rx Phenyl Salicylate gr. V
Po. Ext. of Belladonna gr. ¼
Bismuth subnitrate gr. V
M. ft. chart. D.T.D. No. 12

By proper order of mixing more accurate dosages will result. Also a more elegant mixture can be obtained with greater dispatch. My students are allowed to work in pairs to the extent that one compounds the prescription carefully regarding the proper order of mixing, and the other just compounds promiscuously. Then they compare results and the time required for filling. By this comparison it is not hard to convince them that proper order of mixing is a profitable procedure.

Special techniques must be emphasized at all times and as the opportunity for application arises. For example, in

the prescription given above the technique of mixing the dry ingredients by geometrical dilution can be most forcefully illustrated and its effect can be seen by the student to a good advantage.

A prescription course cannot be complete without details of proper packaging. The student must be impressed with the importance of proper containers not only for appearance sake but for the proper preservation of the ingredient in the prescription.

During the first semester, proper labeling and accuracy of labeling should be dwelt on at length. However, the second semester students should be made to feel that this is their responsibility without further emphasis on the subject. Of course, we know that they must be continually checked for errors.

The above points do not cover the entire picture but briefly they include what we may consider the most important points for emphasis in developing accuracy in our students.

The second of the three major points for emphasis in the teaching of dispensing pharmacy is neatness combined with cleanliness. It is such an important part of pharmacy that those who do not practice it should not be permitted to follow the profession. To impress this on the student a personal check list is handed to each one at the beginning of the first semester.

This list briefly outlines what we expect from each individual. It is considered very personal because it requires the student to be mindful of such things as hair, shoes, fingernails, etc. We require our students to wear clean laboratory coats and the men to wear ties. Each one is expected to wash his hands before starting his work. A professional attitude is maintained at all times in the laboratory. This may seem severe but it develops good habits for the future. When we first started this one of the students met one of the dispensing students on the steps of the pharmacy building and inquired, "Where are you going all dressed up?" My student replied, "Just on my way to Miss Brown's dispensing laboratory. We have to dress like this from now on."

Previously I made the statement that speed or dispatch develops simultaneously with accuracy and neatness or well arranged and clean dispensing counters. However, to make the student conscious of the time element he is required to record the time it takes to fill each prescription on the back of the prescription itself. No particular emphasis is placed on this except a laboratory quiz is given about every two weeks to four weeks at which time the students are given five prescriptions with an hour and a half in which to fill them, clean their desks and utensils and answer any written questions. This increases their speed and they are usually pleased with the progress they make. They find the awkwardness of the techniques experienced at first develop into skilled manipulations which enable them to fill more prescriptions during the alloted time. It is emphasized, however, that at no time is accuracy or neatness sacrificed for speed.

I am convinced that the only hope we have, as teachers, for turning out more competent pharmacists in the future is to use every possible means to attain prescription accuracy from every angle and to train our students in such a manner that all procedures and techniques, neatness and professional attitudes become as much a part of them as the routine daily pattern of habits each individual should develop to attain satisfactory standards of living.

The Prescription Survey as a Teaching Aid in Dispensing Pharmacy

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The teacher of Dispensing Pharmacy finds in the survey of current prescriptions the answer to one of his most pressing problems—that of maintaining his course at a high

*Read before the section of Teachers of Pharmacy at the 1953 meeting in Salt Lake City.

academic level without losing touch with the realities of modern prescription practice. Properly used, the prescription survey increases the student's understanding of the problems and peculiarities of Dispensing Pharmacy, and guides the instructor in the organization of his course.

We have been using, for several years, the findings of published surveys to give our student an idea of the ways in which his training will be applied following his graduation. However, it seemed to us that actual participation by the student in the work of the survey should be many times more valuable than the study of prepared data. With this thought in mind, we put into operation the program which is offered for consideration by this group.

Each student in Dispensing Pharmacy is assigned a limited prescription survey to be carried out in steps over the duration of the course. The first step is the copying of an assigned number of prescriptions. The location of a source of prescriptions offers little difficulty, as our senior student usually enjoys part-time employment in one of the local pharmacies, and his employer is usually quite cooperative in opening his prescription files to us. Certain safeguards are considered necessary. For example, the student is instructed not to copy names of patients or physicians, because of the private nature of the information disclosed. Although we prefer to have the prices of prescriptions, we instruct the student to omit this feature if the pharmacist so requests.

It has been our experience that a frequent source of error in prescription surveys by students is the failure to include the proper proportion of narcotic prescriptions. Our own results have shown consistently higher percentages of compounding with careful control of the sampling of narcotic prescriptions. Our solution to this problem is to instruct the student to copy a specified number of non-narcotic prescriptions, usually one or two hundred, plus all narcotic prescriptions filled during the same interval. To prevent errors due to seasonal variation, the class is divided into twelve groups, with each group assigned to collect prescriptions from a different month of the past year.

With the completion of the first step, the following objectives have been realized: The student has been introduced to the prescription as a reality, rather than as a hypothetical example in textbook or laboratory. He has seen something of the varied ways in which a prescription may be written, and he has shared the practicing pharmacist's difficulty in interpreting incomplete or poorly written prescriptions.

The second step is the percentagewise breakdown of prescriptions into several categories. The student is required to hand in a report giving the following information: percentage of narcotic and non-narcotic prescriptions; percentage of compounded and non-compounded prescriptions; and percentage of prescriptions containing only specialties, only non-specialties, and combinations of specialties and non-specialties. Compounded and non-compounded prescriptions are separately classified according to physical form, as tablets, capsules, liquids, ointments, etc. The average price of the prescriptions is also reported whenever permissible.

By the time he has completed the second step, the student is aware of the relative importance of narcotic prescriptions, of prescription compounding, and of prescription specialties. Frequently he has learned to his surprise that a large number of official drugs are still prescribed as such.

The third step is a determination of the frequency with which the various prescribed drugs occur. The report for this phase of the survey consists of a listing of all drugs which occur in the prescriptions in order of frequency, with the total number of mentions and the percentage of prescriptions containing each ingredient. It has been our practice to group all forms of a single drug under one heading, and to consider mentions by official title separately from those by trade name if the drug is available from more than one manufacturer or distributor. In the completion of this step the student has become familiar with the more frequently prescribed specialties in their various dosage forms, and in commonly used combinations.

The fourth and final step in the individual prescription survey is the classification of all prescriptions according to therapeutic use. This step is placed late in the second semester to allow completion of most of the course in pharmacology, which is given concurrently with the dispensing pharmacy course. The inevitable discussions almost always result in better understanding of the intent of the physician in prescribing combinations of drugs, and in the varied uses of individual drugs.

An aspect of the individual prescription survey which has not received previous attention in this paper is the relative lack of reliability in samples consisting of only one or two hundred prescriptions. This aspect is not ignored in our program, however. Following the submission of individual reports, a composite report is made up by the instructor. This report is distributed to the student, the participating pharmacist, and any other interested party. The composite sample in the past has consisted of over eight thousand prescriptions from approximately seventy pharmacies, and is sufficiently large to make a high degree of reliability probable.

The composite picture obtained from the individual prescription surveys has been quite useful in our recently completed curriculum revision. It has been partially responsible, for instance, for the establishment of a separate course in pharmaceutical specialties, to give greater emphasis to the rapid growth in this field. It has also been responsible for changes in the amount of lecture and laboratory time allotted to different tpes of preparations. For example, an equal number of laboratory periods was formerly given to divided powders and capsules. We now find it better to assign two periods to capsules for each one spent on divided powders.

It is our fond hope and belief that the carefully supervised individual prescription survey has helped us make the course in Dispensing Pharmacy more attractive and more practical without sacrificing any of the academic values. It entails additional work for the conscientious instructor, but, as in the case of the assay of student preparations, the author believes that the results obtained justify the effort expended.

The President's Page

SO MUCH TO BE DONE

Administrators and educators are continuously faced with a multitude of problems, among which may I mention specifically: budget, improvement of staff, improvement of teaching methods, recruitment, enrollment, expansion of facilities, alumni contacts, and the increase in the length of the educational program. This is as it should be. It denotes a healthy condition in the field of pharmaceutical education.

My purpose in this message is to direct your attention to a program which, in my opinion, is at the present time of critical importance, i.e., Public Relations as it pertains to pharmaceutical education. I do not propose to teach you public relations practices, for there are excellent sources of information for that purpose. I do, however, believe it is necessary to emphasize that the colleges and schools of pharmacy MUST embark upon a program dealing specifically with what they are doing in pharmaceutical education. Too little is known by the parent, the applicant, and the members of the other health professions regarding the pharmacy curriculum. It is revealing to learn that very often many teachers of the faculties of other schools in a University are not at all familiar or conversant with the course content in the pharmaceutical curriculum. Inquiries frequently reveal that it is not generally known that department heads and teachers of professional rank, in a school of pharmacy, have attained their graduate degrees with majors in the particular field which they direct.

Believing this, I do, however, propose to make mention of some areas where good public relations on the part of the colleges can do much for the profession.

Public relations as it applies to pharmaceutical education is an important job for every teacher in a school of pharmacy, whether he be a graduate student assistant, an instructor, assistant professor, associate professor, department head or

dean. This also applies to the administrative staff, including the librarian and registrar. Every person in the institution must be prepared at all times to answer the many questions dealing with pharmacy, and pharmaceutical education, which are presented to them by the lay public, members of the other health professions, and the faculties of other schools.

Every effort should be made by the colleges of the association to place at the disposal of high school counselors all available information relative to the opportunities in fields of pharmacy. The brochure, "Shall I Study Pharmacy," is one excellent vehicle for this purpose. The brochure should be placed directly into the hands of the counselor. This can be accomplished by a member of the staff of a school of pharmacy who can answer any question which might arise on the part of the counselor. Alumni of the schools, who are particularly concerned with the recruitment of top flight students to the field, can in many instances perform this important service.

Members of an admissions committee should be well grounded in the principles of public relations. They should be warm and friendly and "down to earth" in their dealings with applicants.

Parents, and this is also true of many applicants, very often do not understand the term "curriculum." It seems far better to speak of the courses of study, the reason for the course sequence, and the importance of the various prerequisites. This, of course, takes time, but the value of this procedure is immeasurable.

The colleges for years have made efforts to explain to the alumni the reason for the continuous change in the pharmacy curriculum. Opportunities are presented continuously to the colleges when alumni pay visits to their Alma Mater. At such times a few minutes devoted to explaining to the visiting alumnus the changes in the curriculum, improvements in facilities, new apparatus procured, and introducing new members of the teaching staff, will result in securing well-informed, enthusiastic supporters of the aims and purposes of his institution. He in turn will enthusiastically

explain to his fellow pharmacists, and to the lay public, the pattern of pharmaceutical education.

The deans and members of the teaching staffs on many occasions appear before the faculties of our schools. These afford splendid opportunities to devote just a few minutes to acquaint such groups with the qualifications of the staff, and the area of specialization of each one.

A better understanding of the problems, educational and otherwise, which confront many other fields, frequently results in beginning co-operative research and participation of faculty members of pharmacy schools in the many seminars in other disciplines of a University. I believe it is necessary to emphasize that the schools and colleges of pharmacy have not taken full advantage of the many opportunities presented to them to explain the many areas of pharmacy, and in fact, pharmaceutical education also in all of its aspects.

There is a need for an extensive public relations program that portrays to the public the education of the pharmacist and the importance and necessity of such a course of instruction. Educators and administrators have an obligation to acquaint the "grass roots" practitioners (the pharmacist, regardless of his field of activity) with public relations practices. This can in a measure be accomplished by classroom teaching for early indoctrination and by means of seminars for graduates. These measures can be supplemented by use of newsy bulletins or occasional letters on new developments in pharmaceutical education, and co-operation with the AACP in the development of a program.

A well-defined program of public relations in the field of pharmaceutical education on the part of the colleges of the Association, will be reflected in substantial contributions on the part of its product, the pharmacist, in his civic activities on the local and community levels. It should also arouse greater interest on his part to co-operate with his trade and professional associations.

It must be of great practicality and of interest to the pharmacist, because he is one person who can be of real assistance in putting such a plan in operation.

We all have, no doubt, read with a great deal of interest the activities of many state pharmaceutical associations in the nature of physicians and pharmacists banquets, and seminars in which both physicians and pharmacists participated. It is also of interest to read that an increasing number of exhibits on pharmacy are on display at medical conventions. These are extremely important in the promotion of good professional relations in the area of the health sciences.

The value of good public relations has been recognized by many industries, societies and associations. Many of these organizations have recently published and distributed to its members some form of public relations material. Among those which are of special interest are the following: PR/A.P.M.A.—"A Primer of Public Relations for the Pharmaceutical Industry" published by the Public Relations Committee of the American Pharmaceutical Manufacturers Association; Rx/P.R.—"A Public Relations Manual, depicting the human side and the business side of medical practice," published by the American Medical Association; The American College of Apothecaries, "Public Education" program; the NARD program of public relations, "An Extensive Public Relations program that sells the value of the pharmacist's professional service to the public . . . and in particular to the community in which he is located;" the A.Ph.A., National Pharmacy Week program, and its expansion;" "Careers in Chemistry and Engineering" by the American Chemical Society; and certainly of special interest to the AACP is the new brochure "Shall I Study Pharmacy."

Another area in which a public relations program in pharmaceutical education by the AACP could prove effective, would be in keeping the public informed as to the need for graduates of our schools. In "The Kiplinger Washington Letter," under date of December 26, 1953, under the caption "*About Jobs in the Future*" listed as needed in the Professions are Physicians, Dentists, Nurses, and all social workers, but no mention is made of the need for pharmacists or, for that matter, of pharmaceutically trained personnel.

Also in NEWSWEEK, Vol. XLII, No. 26, December 28, 1953, under employment we find the following: *"Your chances of finding a job in 1954"*—for the Doctor . . . Good; for the Nurse . . . Good, but no mention is made of the other members of the health professions.

In my installation address at the annual meeting held in Salt Lake City, August 1953, I recommended that "a public relations committee on Pharmaceutical Education be appointed. This committee to consist of two or three members and the committee to be instructed to request the American College Public Relations Association to appoint two or three members of their association to meet as a joint committee to initiate a study of the public relations problem as it pertains to pharmaceutical education."

This recommendation was approved by the Association. The composition and activation of this committee will be a matter of business at the interim meeting of the Executive Committee to be held in Chicago late in January, 1954.

It is my hope that a constructive program will be formulated by this committee.

Edward C. Reif
President

New in the Family

Merrill Patricia Cross..—Born September 24, 1953, daughter of Prof. and Mrs. John M. Cross, Rutgers University.

Michael Joseph Frost.—Born November 14, 1953, son of Mr. and Mrs. David Frost, Rutgers University.

Scott Grove Wenzel.—Born September 25, 1953, son of Dr. and Mrs. Duane G. Wenzel, University of Kansas.

Brian Earnest Rhodefer.—Born November 19, 1953, son of Mr. and Mrs. Rhodefer, Washington State College.

Victoria Elizabeth Martin.—Born November 12, 1953, daughter of Mr. and Mrs. Frank W. Martin, St. Louis College of Pharmacy and Allied Sciences.

The Editor's Page

Now and then there comes in the mail a letter that takes me back into the yester years and stimulates some serious thinking. This time the letter came from a student of former years, a young man who has made a place for himself in science and in education in the pharmaceutical area. It was written on paper bearing the letter head of the School of Pharmacy of The State College of Washington. It bears the date of July 23, 1953 and it reads as follows:

"Dear Dr. Lyman:

As an undergraduate I spent many hours on the receiving end of your lectures. I am, therefore, in a position to believe you are not averse to some nostalgic reminiscing. To that purpose this letter is dedicated.

In the pharmacognosy files of Dean Dirstine which were turned over to me, I found a series of copies of **The Pacific Pharmacist** of 1917. These were filed because of a series of articles they contained on belladonna culture. But I found something in them of greater interest (even to a pharmacognosist) than belladonna cultivation. I have enclosed part of an address which you probably well remember. The letters included are of particular interest. It was quite amazing for me to find the Presidents Wheeler of California, Hutchins of Michigan, and Smith of Pennsylvania suggesting the same things for pharmaceutical education that "thinking" educators in the field are striving for today. And that was before I was born!!

One must conclude that these college presidents were generations ahead of their colleagues in thinking or that pharmaceutical educators are indeed a slow lot!!

Best wishes

Melvin R. Gibson

Associate Professor of Pharmacognosy"

The address referred to was my presidential effort before the American Conference of Pharmaceutical Faculties at the annual meeting in Indianapolis in 1917. It contained a number of letters from presidents of leading universities who had been asked to express their views as to what pharmaceutical educators should do to bring pharmaceutical education and practice to a par with that of the other health professions. The thinking of these men in the field of general education was so far ahead of that held by the mass of pharmaceutical educators of that time that Dr. Gibson was naturally led to conclude 'that college presidents were generations ahead of their colleagues in thinking or that pharmaceutical educators are indeed a slow lot." If we change the word "are" in the last sentence to were, Dr. Gibson is right in both of his conclusions.

There are some pharmaceutical educators today, although their number seems to be on the decline, and some pharmacists who are maintaining that the status quo is all sufficient for the education of the pharmacist. If history repeats itself these groups can look forward to being called a "slow lot" by future generations of young men who have vision.

It is a significant fact that the opposition to expanding both the general and the professional educational program is coming from those who are thinking in terms of the present and the past and not from the pharmacy student who is thinking of the changes that will take place in the practice of pharmacy in the future and with which he must be prepared to cope.

Every time I approach the task of writing the Editor's Page there comes an urge to pay tribute to the young men and women who have the making of the future of pharmacy in their hands and are doing such a commendable job of it. In a recent letter to Dean Charles H. Rogers of the University of Minnesota, I mentioned the lonesomeness that I sometimes experienced when attending the national meetings because of the absence of most of that "old bedroom

group." Every member of that group had at some time enjoyed the comfort of an old George Washington type of bed, as a guest in the home of the late beloved Wortley F. Rudd in Richmond, Virginia. I also mentioned what a comfort it was to see how the present generation is carrying the ball toward even higher goals. Dean Rogers' reply reads as follows:

> "Your personal note was very much appreciated. Like you, I experience a feeling of lonesomeness when I have attended some of the APhA meetings the last few years. I quite agree with you that it is becoming a real comfort to me to see how the younger generation is taking hold of things and, furthermore, I am tremendously pleased (and in some cases amazed) at the thinking of some of these young men. They seem to be able to look far into the future and are advancing their sights not merely for today or tomorrow (which seldom comes) but the generations which are to follow them. Besides having a load of fun, the old "bedroom group" used to do some serious thinking and planning not only for the then present time but also for the future. The progress that is being made in pharmaceutical education within the last few years might indicate that each one of us had a little to do with cementing together the stones of a firm foundation upon which the young men could build."

When I observe this generation at work in the APhA, in the AACP, in the Plant Science Seminar, in the Association of Hospital Pharmacists, in the American Colleges of Apothecaries, and other national, state and local organizations, without fanfare but with great sincerity of purpose, the conviction grows that herein is the Strength of Pharmacy at work at its best.

In sending out notices to the collaborators of the Journal fixing the dead line for news items for the January issue, I addressed one collaborator as a good fellow Presbyterian because that is what he is. He is also the soul of a college of pharmacy of a great university. He is probably making a greater effort to inculcate ethics into the minds of students while they are in the class room than any of the rest of us. When his news items came they were accompanied by a letter which contained a statement of his problem. The letter reads, in part, as follows:

"I enjoyed your reference to me as a fellow Presbyterian, for that is exactly what I am, but I am writing to tell you that I am a disturbed fellow Presbyterian who takes courage from a note of a friend of his, like you, or from his minister on Sunday morning. For occasionally, I am the target of loose talk and false accusations of retail pharmacists, and I believe most of the cause of this situation is the good brand of ethics we are teaching at the College of Pharmacy. Some of our students, when they go into practice, refuse to do some of the things that a few of our pharmacists have done while professing to believe in a code of ethics. Well this does not state the case very well, but perhaps you may find time to write me a note to encourage me further, or the subject may even be one about which you could comment editorially. If you do the latter, please be sure that I am Mr. Anonymous, himself? Let me assure you that I do have courage to carry on the orientation course, including professional ethics, but a little encouragement would be nice."

The reasons for the writer's desire for anonymity are perfectly obvious.

On a number of occasions I have heard retailers commend the colleges for the efforts that the faculties are making toward the teaching of professional ethics. The thing, however, that many of them either do not know or seem to forget, it that ethics may be taught in the class room but in practice the standard is set in the drugstore. In so far as this subject is concerned, the drugstore is the laboratory for the theory that is propounded in the classroom. If one standard is set in the classroom and the drugstore standard nullifies that action, something is wrong and the responsibility for wrong doing must be corrected where it is made. Teaching one thing in the classroom and doing the opposite in the store reminds me of what Dr. Robert L. Swain once said so well, "Prohibition was sold down the river because senators said one thing in the cloak room and did another on the floor of the senate chamber." The question may well be asked, "Who is selling the standards of pharmaceutical ethics down the river?" As I see it the only thing the faculties can do is to keep on teaching. May we all have the courage expressed by my Presbyterian colleague to do just that.

In these formative years in which we are building a more efficient program for pharmaceutical education, it is stimulating and informative to observe what is taking place in the minds of teachers and professional men in the related professions. The thinking in the dental area is well demonstrated by taking a glance at the program of the Fourth Annual Pacific Coast Conference on Dental Teaching which was held at the University of Southern California on September 9-11, 1953.

The first day of the session was devoted to a consideration of the more general aspects of the problems of dental education such as: New Perspectives in Dentistry and Their Relation to Dental Education; the Council of Dental Education and the Dental Curriculum; Objectives of the Education of a Dentist; and The Curriculum of Professional Education. The last named subject was discussed by Dr. Lloyd E. Blauch of the U.S. Office of Education who we like to think of in Pharmacy as our own personal property but it is forunate that his knowledge, his good common sense, his broad experience and his vision of service is available to all the health professions.

The program of the second day was apportioned between the Social and Humanistic Aspects of the Education of Professional Personnel, and the Curriculum Problems in the Basic Sciences of the Dental Curriculum in which the Aims and Objectives were discussed by our own Dr. John J. Eiler of the College of Pharmacy of the University of California, and the area of Pharmacology and Therapeutics was handled by our own Dr. James M. Dille of the University of Washington. The day closed with a discussion of the question, How Does a Teacher Develop the Subject Matter and the Teaching Procedures for Courses: (1) in General Education; (2) in Dental Education.

The final day was devoted to the Curriculum Problems in the Technical and in the Clinical Subjects of the Dental Course.

The speakers on the program were chosen from the outstandng men in dentistry, medicine, pharmacy and liberal

arts of the west coast area, all specialists in their respective fields. It is obvious the dental profession is not satisfied with the status quo and what concerns dentistry, concerns pharmacy as well.

We announce with sorrow the passing of Dr. Alfred H. Olive of Howard College, Birmingham, and Dr. C. J. Zufall of Purdue. Dr. Olive's great work was with students in the classroom in the schools where he served. As a matter of fact, it is within the classroom where a teacher does his most effective and lasting work. It has been my own experience that the lessons students learn in the classroom are the ones they mention and are appreciative of ten, twenty, thirty, and forty years later when they meet me on the street, and the majority of the lessons are not those that have to do with their professional practice but with the personal problems they have met in their living.

The same may be said of Dr. Zufall's service and his personal relationships. Well do I recall his enthusiasm in his search of the unknown, an enthusiasm that was contagious. These men will continue to serve generations of students in the future. In that we find great comfort.

Rufus A. Lyman

The Old World Apothecary Shop, which has been on exhibition in the Smithsonian's Division of Medicine and Public Health since 1946, is a complete restoration of a European drug store of the 18th century. The fixtures and much of the collection of rare mortars and pestles, apothecary jars, and other antique pharmaceutical equipment came originally from the "Muenster Apotheke" in Freiburg, Germany. The shop was first opened as a museum in Wiesbaden in 1888. It was purchased by E. R. Squibb and Sons in 1932 and given to the American Pharmaceutical Association which deposited it in the Smithsonian Institution in 1946. The Institution has now made available, for the very first time, a Kodachrome postcard reproduction of the famous Old Shop. The colored postcards are available at 5 cents each. Orders should be sent and remittances made payable to The Publications Division, Smithsonian Institution, Washington 25, D. C.

Notes and News

Albany College of Pharmacy.—Dr. Albert Vander Veer, II, has been elected a member of the Board of Trustees to succeed his father, Dr. Edgar Vander Veer who died in September after serving on the Board for 37 years. Mr. Kenneth Griswold of the Eli Lilly Company was elected first Vice-President and Dr. Maurice L. Tainter, Director of the Sterling Winthrop Research Institute, was elected to represent the College on the Board of Governors of Union University. Dr. Vander Veer had both of these positions before his death.—Dr. George B. Ceresia, Ph.D., Purdue, and Dr. Mervyn, Ph.D., Minnesota, have been appointed as assistant professors in the department of chemistry.

University of Arizona.—The Annual Fall Honors Assembly for the recognition of outstanding scholarship and leadership was held on November 19, 1953. The main address was given by Dr. C. S. Boucher, former Chancellor of the University of Nebraska and long-time friend and associate of Dr. Rufus A. Lyman, first dean of the College of Pharmacy of the University of Arizona. Dr. Boucher's address was entitled "Honors and Education in Perspective". General Honors for high scholastic standing were won by Miss Dolores Strittmatter and William E. Brincko; Third Year Honors went to Barry Clothier and Harvey Baza; and First Year Honors were awarded to Richard Hamilton. The Tonta Scholarship Award also went to Miss Strittmatter and the Brunswig Drug Award was won by Louis Deckelmeier.—The pharmacy students participated in the homecoming activities by preparing a float for the parade and holding a reception for pharmacy alumni in the Pharmacy Building on November 21.—Both students and faculty participated in the First Annual Mid-Year Meeting of the Arizona Pharmaceutical Association held on the University campus on November 14. The main features of the program were a tour of the College; a film and oral presentation entitled "Design for Selling" by Mr. Sam Swisher of the Johnson and Johnson Company; an address by the Honorable Barry Coldwater, United States Senator for Arizona, on the subject of the factory inspection bill and other pharmacy legislation; and a panel discussion on prescription pricing led by Mr. Dave Ginsburg of Tucson.—Alpha Pi Alumni Chapter of the Rho Chi Society held a meeting on November 23 at which an address on the subject "Radio-active Isotopes in Biological Research" was given by Dr. Wallace Fuller, associate professor of agricultural chemistry and chairman of the Committee for Procurement of Radio-active Isotopes for the University of Arizona.

University of Arkansas.—The entire staff of the School of Pharmacy has completed the American Red Cross standard, advanced, and instructors training courses in first aid and civilian defense.—David D.

Stiles of the Abbott Laboratories spoke recently to the students on some of the phases of his work in making prescription surveys. Among the points he discussed were some considerations on prescription trends, the variation in prescription prices and the result of duplication of prescription items.—New prescription surveys being conducted by Prof. Frank Williams of the pharmacy staff, will check store personnel for appearance, attitude, suggestion selling, sales ethics and a number of other factors considered to have a bearing on successful selling in drug stores. It is expected that the survey will bring out the real reason why certain stores do not gross more money and to help them take in more money.—An optional curriculum went into effect with the beginning of the 1953-54 school year. It consists of 64 hours of prescribed pre-pharmacy work to be taken in the College of Arts and Science of accredited colleges or universities, followed by three years of professional work in the Medical Center of the University of Arkansas, in Little Rock. It has already become apparent that this is the preferred choice for those students interested in pharmacy. Students by and large are usually the first to grasp the opportunity to better prepare themselves for the more advanced curriculum. The higher standards appear to be the right kind of challenge for students in pharmacy.—A second temporary building has been constructed to provide facilities for the pharmacology and physiology laboratories, the animal room, the compounding and dispensing laboratory, the stock room and the beginning pharmacy laboratory. All these laboratories are being equipped with stainless steel furniture designed for efficient teaching needs. Temporary buildings for these laboratories have been constructed pending the completion of the new University of Arkansas Medical Center.—The $8,500,000 teaching hospital and out-patient clinic which has been under construction for two years will require another year for completion.—The $4,000,000 Medical Education Building is now on the drawing board and the contract for its construction will be let this year. It will provide the physical facilities for the Schools of Medicine, Nursing and Pharmacy.—One of the highlights of the Arkansas State fair was a demonstration of atomic energy by the pharmacy students in a tent lined with instruments and equipment from Oak Ridge, Tennessee. Working in three shifts of eight men each the students split the atom with the Van de Graaf Electrostatic Generator. Another exhibit was a small model of the Oak Ridge atomic pile, showing how certain minerals can be made "hot". One exhibit consisted of a large map of the world with varied colored lights pin-pointing the location of veins containing radioactive ores.—Other exhibits covered research in agriculture, medicine, and atomic energy in use as power sources for electric energy.

University of Buffalo.—A joint graduate seminar with the department of pharmacology of the new medical school has been arranged for alternate Tuesdays.—The Student Branch held its first meeting October 7, with the general topic "Your Pharmacist Works for Better

Pharmacy". Prof. W. Lipp, of the medical faculty, and Prof. D. H. Murray, of the School of Pharmacy, presented papers.—The awards day, on November 3, was the largest in the history of the school, with 32 students receiving a total of more than $10,000 in awards and fellowships.—The annual Christmas dance was held at the Park Lane Hotel, December 11, with a large turnout. Activity keys were awarded during the intermission to five seniors who had been most active in the affairs of the School of Pharmacy.—A student panel discussion of the curriculum was held November 12.—Dr. John Kleber attended the testimonial dinner in New York City, December 7, at which the Remington Medal was presented to Dr. Hugh C. Muldoon.—Dean A. B. Lemon attended the annual meeting of Boards of Examiners, Councils and Committees of the Division of Professional Education held in New York City, December 11. At the State Board meeting on December 10, Dean Lemon made the presentation address to the retiring member, Dr. Fred Lascoff.—There have been three recent additions to the staff. Prof. D. H. Murray, formerly assistant professor of pharmaceutical chemistry at the University of Toronto, took up his duties as assistant dean and professor of pharmaceutical chemistry on September 1. Dr. Farnsworth, of the biology department, has been appointed as instructor in pharmacognosy. Dr. Clifton F. Lord, Jr., previously at Creighton, has accepted a position as assistant professor of pharmacy and enters on his appointment in the spring semester.—A new graduate course has been instituted, *The Physico-Chemical Basis of Drug Action*, presented for the first time during the fall semester by Prof. Murray.

Butler University.—The second annual Science Fair at Butler University will be held this spring with Dean Kaufman as chairman. Cosponsors are the Indianapolis Medical Society, Indianapolis Chapter of the American Chemical Society, and the Indianapolis Retail Druggists' Association. The Science Fair will include entries from the seventh and eighth grade pupils as well. The Pharmacy College laboratories will be used to house most of the displays.—The Haag Drug Company and Butler University are cooperating on a student loan plan whereby Junior and Senior students employed by the Haag Drug Company receive financial assistance while enrolled for the pharmacy course. Effective for the second semester beginning in February, twelve loans of $375.00 each will be available each semester.—Donald Franz, a senior pharmacy student, has been elected president of the University Student Council for 1953-54; he is also captain of the University's Track Team.—At a recent meeting of the Loyalty Legion, William Clark, a senior pharmacy student, was elected president of the group. The Legion is made up of four representatives from each organization on the campus.—A display relating to National Pharmacy Week was installed in the case on the main floor of the pharmacy building. The display was installed under the auspices of the Student Branch and emphasized how the pharmacist works for better community health through improved pharmacy training.—Carolyn McClurg, a senior pharmacy stu-

dent, was elected counselor for the Association of Women Students.— The October meeting of the Butler University Sigma Xi Club was held in the Pharmacy Building. Prof. Robert L. Prettyman of the Pharmacy College faculty was the speaker. His subject: "Plant Zones of Colorado."

University of Southern California.—The latest addition to the School of Pharmacy is a complete prescription store. Located on the first floor of the pharmacy building, it will serve the faculty and students of the University with prescription service and drug and health supplies. The modern maple fixtures and mirrored showcases were donated by alumnus Marshall J. Malloy, member of the State Board of Pharmacy, and the store was completely stocked with initial merchandise by the drug manufacturers and wholesalers. The operation will be in charge of Prof. Paul Kalemkiarian, instructor in pharmacognosy. This installation will provide a full-scale, operating pharmacy for study by the senior class in prescription practice, and classes in pharmaceutical needs of the campus.—A luncheon for the student body and faculty, sponsored by the Student Branch of the APhA was held recently at the Eleda Restaurant in Leimert Park. The speaker was Mr. Francis J. Walsh, Vice-President of Horton and Converse.— Dean Alvah Hall closed the seminar series in Fresno, California on December 9, and addressed the alumni of the Visalia area the following evening.— 375 Alumni attended the homecoming banquet held at the Statler Hotel in Los Angeles on November 20. Governor Goodwin J. Knight and Newell Stewart addressed the group. The alumni were interested to learn that Governor Knight had given several lectures in pharmacy law at the University of Southern California School of Pharmacy many years ago. Prof. Edward S. Brady spoke during the chapel hour at La Sierra College, the Seventh Day Adventist school at Riverside, California. 2500 students heard his talk on "Opportunities in Pharmacy." He also recently addressed the Kiwanis Club of Lomita, California.— Dr. John A. Biles told the Greater Los Angeles Chapter of the APhA about "Sterile Ophthalmic Solutions" at a recent meeting at the Queen of Angels Hospital. Dr. Roger Erickson (Pharm.D. S.C. '53) was elected president of the group for 1954.— The senior class, under the guidance of Dr. Orville H. Miller, visited the plants of Hyland Laboratories and of Don Baxter, Inc., recently, and Prof. Willard Smith took his freshman group through the modern facilities of the Brunswig Wholesale Drug Co.— A recent appointee to the State Board of Pharmacy is Max Weisberg, director of prescription departments for Owl-Rexall, whose son Jerry is a student in the Doctor of Pharmacy program at Southern California.

University of Colorado.— The annual College of Pharmacy banquet was held on December 5 with the Student Branch in charge of arrangements. Members of the Colorado State Board of Pharmacy and the Officers of the Colorado Pharmaceutical Association were honored guests. The main speaker on the occasion was Dean Delbert Duncan,

of the University School of Business. The Rho Chi Freshman Achievement Award was presented to Ross Tyler as the outstanding freshman of the year 1952-53.—Dr. John G. McDonald, B.S. (Pharmacy), and M.D., University of Colorado, has been awarded a $10,000 grant from the Boettcher Foundation for research in endocrinology. Dr. McDonald is a clinical instructor in medicine at the Medical School and a practicing physician in internal medicine at the Boulder Medical Center. Most of the work will be done in the pharmacology laboratory of the College of Pharmacy with Dr. Harold C. Heim, associate professor of pharmacy and Mr. Richard Deitrich, graduate assistant, assisting.— Dean Charles F. Poe and Prof. Fred C. Drommond participated in the meetings of the Annual Conference of Students and Principals recently held on the campus. More than 100 administrators from Colorado high schools met with their graduates who are now freshmen at the University and discussed mutual problems. Group conferences were held also.— Dr. Norman F. Witt, head of the department of chemistry and also pre-medical advisor, recently attended a conference of medical, dental and veterinary school deans and pre-medical advisors from the western region at Albuquerque, New Mexico. The conference was sponsored by the Western Interstate Commission of Higher Education which represents institutions in Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, and Wyoming.— Alpha Theta Chapter of Rho Chi recently held initiation ceremonies for 14 new members.

Columbia University.— Mrs Anne Grosso, chief pharmacist at Columbia Presbyterian Hospital, addressed the Student Branch on December 2. She described the many services offered by the hospital pharmacy department and explained the many opportunities in the field of hospital pharmacy. Besides giving lectures to students of medicine and nursing, she supervises a staff of nine registered pharmacists and nine other personnel. She is well known in the pharmacy field having received many honors in her forty years of service in the profession.— Mr. Leslie C. Jayne, Secretary of the Board of Pharmacy of the division of professional education of the state of New York, spoke recently before the senior class relative to the requirements of licensure.— The junior and senior classes visited the Lilly and the Abbott laboratories in January.— Mrs. Myrtle Augustin, a graduate of the University of Wisconsin School of Journalism, who for seven years has been associated with the office of the registrar of Columbia, has been appointed registrar of the College of Pharmacy.— Dean E. E. Lewallen and Prof. Abraham Taub, as members of the University Council, attended the special Columbia University convocation honoring the King and Queen of Greece when King Paul was awarded the degree of Doctor of Humane Letters.— Milton P. Matthews, assistant professor of pharmacy administration at the University of Utah, was a visitor at the college's library, recently, in connection with his

research toward the doctorate.— Two new staff appointments have been made as assistant professors: Dr. Michael M. Clay in pharmacology, and Dr. Louis Malspeis in pharmaceutical chemistry. Dr. Clay had his undergraduate work at Ohio State and Toledo, graduate work at Cornell, Toledo and Ohio State Universities. He has the master's from Toledo and the doctorate from Ohio State. He is a member of Kappa Psi, Phi Kappa Phi, Rho Chi, Sigma Xi, and Beta Beta Beta. Dr. Malspeis has the bachelor's from Rutgers and the doctorate from the University of California at Berkeley where he held a Fellowship from the American Foundation for Pharmaceutical Education. He is a member of Rho Chi, Sigma Xi and the American Chemical Society.

University of Connecticut.— Four new fellowships have been established at the College: one by the Sterling-Winthrop Research Foundation; one by the Atomic Energy Commission; and two by the Fesler Company, Inc.— Plans are under way for an optional five year course to be offered in the near future.— All floors of the additions to the new pharmacy building are now occupied and being used for undergraduate courses in pharmacology and for research. A radio isotope laboratory has also been installed in this part of the building.— The inner court garden has been completed and the greenhouse is in full operation.— Two senior pharmacy students have become outstanding in campus activities. George Tonderas is president of the University football team.— Three members of the pharmacy staff have been promoted in rank: Arthur E. Schwarting to professor of pharmacognosy; Donald M. Skaven to associate professor of pharmacy; and Walter R. Williams to associate professor of chemistry.

University of Georgia.— Representing the University of Georgia at the investure ceremonies held in Augusta on November 24, 1953, honoring Dr. Edgar R. Pund as president of the Medical College of Georgia were the following: President C. C. Aderhold; Faculties' Dean Alvin B. Biscoe; and Pharmacy Dean Kenneth L. Waters.

George Washington University.— Dr. Willis E. Moore, B.S. summa cum laude, and Ph.D. from Ohio State University, has joined the staff as assistant professor of pharmaceutical chemistry. He is a member of Rho Chi.— The school will participate in the national prescription survey to be conducted by the Abbott Laboratories. Dr. S. J. Greco, associate professor of pharmacy, will supervise the survey. Mr. David Stiles, director of market development at Abbotts visited the school in December to assist in initiating the survey. While here he addressed the Student Branch on "Prescription Trends."— President F. Royce Franzoni addressed the Student Branch in October on the value of the professional organization to its members.— The national convention of Kappa Psi had the local undergraduate chapter, Gamma Tau and the graduate chapter of the District of Columbia as hosts at its meetings in Washington, December 28-30, 1953. Dr. Paul Briggs and President Franzoni were the guest speakers.— Alan Berger has been

named the recipient of the Alpha Zeta Omega Scholarship which is a one-year award in the amount of $500 granted to an outstanding senior of one of the local public schools.— Assistant Professor Leonard was awarded the doctorate in December by the University of Minnesota.— Louis E. Kazin, associate editor of Drug Topics has been appointed to the seminar staff and will present lectures during the second term to the senior class on Contemporary Pharmacy.

University of Houston.— Dr. Melvin W. Green and Dr. B. V. Christensen representing the American Council on Pharmaceutical Education, and Dr. B. B. Brown of Dallas and Leon L. Kahanek of Hallettsville representing the Texas Board of Pharmacy, inspected the College of Pharmacy on October 15 and 16 for the American Council relative to accreditation.

Howard College, Birmingham.— The Division of Pharmacy recently published a bulletin with pictures of the facilities and information of interest to prospective students.— Dr. W. R. Byrum discussed "Research Technique in Undergraduate Teaching" at the annual Howard College Faculty Workshop in September.— During the Birmingham Retail Druggists' Observance of United Nations Week, Dr. Byrum and Elias Ladas, a pharmacy student who has spent most of his life in Greece, were invited to speak before the organization.— Five students were awarded Walker Scholarships in Pharmacy. This scholarship fund was established in 1950 in memory of W. W. Walker, Sr., founder of the Wholesale Drug Company in Birmingham, for worthy students of pharmacy.— The Student Branch, outlining its programs for the school year, has adopted the theme, "This is Pharmacy." Speakers from various fields of pharmacy and allied sciences have been invited to present a picture of the profession of pharmacy.— Twenty-five students made an inspection trip to the Eli Lilly and Company plant in November.— The annual Pharmacy Seminar, sponsored by the Alabama Pharmaceutical Association in cooperation with the schools of pharmacy, was held at Howard College in November. The featured address was by Dr. Paul C. Olsen of Drug Topics on "The Prescription Department—Heart of the Drug Store." Dr. Byrum and Prof. Nelson of the faculty gave papers on "Objectives of the Curriculum in Pharmaceutical Education" and "Short Cuts to Better Drug Store Management," respectively. Various panel discussions on other phases of pharmacy were a part of the program.— Mr. Joe Vance, instructor in Hospital Pharmacy, has been appointed to a five-year term on the Hospital Licensure Advisory Board by the Alabama State Board of Pharmacy.— Dr. Jack T. Bryan spoke recently before the Student Branch on the subject "Chemical Constitution and Pharmacological Action."—The Library has just received a purchase which completes, with the exception of a few numbers, its bound file of the **Journal of Pharmacology and Experimental Therapeutics.** The College is indebted to Mr. W. W. Walker, Jr., local wholesales for a substantial part of the

purchase.— After a concerted voluntary membership drive, the Student Branch has attained 100% membership in the junior and senior classes and hopes soon to announce a 100% voluntary membership for the entire enrollment.— Construction on the new campus for Howard College has been initiated with the clearing of the site and installation of the necessary utilities. It is expected that three buildings will be constructed in the spring, one of which is to be the Pharmacy-Biology building.— The Howard College Alumni Association at a recent meeting voted to establish a "Howard College Alumni Research Foundation" for the purpose of promoting growth, progress, and general welfare of pharmaceutical educa ion and research by the Division of Pharmacy of Howard College. Another highlight of the meeting was a report on the progress of the Division by Dr. W. R. Byrum.— Miss D. Rachel Bell, who formerly taught Business Administration in the College of Liberal Arts, has been appointed as assistant professor in the newly created Department of Pharmacy Administration.— The members of the junior class, accompanied by Dr. Phillip V. Hammond, visited the Smithsonian Institute in October.— The members of the junior and senior classes visited the Henry B. Gilpin Wholesale Drug Company in November where they heard lectures and discussions on sales promotion and merchandise display.— The Student Branch observed National Pharmacy Week at the October meeting. The program consisted of a recorded message from the APhA Headquarters and Dean Cooper spoke on "The Future of Pharmacy at Howard University." Other members of the staff also spoke at the meeting.— The guest speaker at the November meeting of the Student Branch was Mr. Isadore Brem of the Brem-Klein Insurance Agency who spoke on the subject "The Significance of Insurance in the Practice of Pharmacy."— On December 10, Mr. F. Royce Franzoni, president of the APhA was honored at a dinner given by the Student Branch in Baldwin Hall on the University campus. In his address President Franzoni stressed the importance of pharmacy as a public health profession and the obligations upon the practitioners of pharmacy in rendering public and civic services as well as fulfilling their professional obligations honorably. He stressed the Code of Ethics of the APhA and the obligations of the pharmacist in his relations with the public, to fellow pharmacists and to o.her health professions.

Idaho State College.— Two new elective courses have been added to the curriculum. One is Hospital Pharmacy, 2 or 4 hours credit, and the other, Introductory Pharmacology, 4 hours credit.— The pharmacy faculty has organized a Pharmacy Student Council in order to allow the students more opportunity to voice constructive criticism of their college and its administration. It is composed of two elected members from each of the four classes and two officers from each of the student organizations: Rho Chi, Phi Delta Chi, and Refill.— The results of a survey of the graduates of the College have been tabulated and they

reveal that 56% are pharmacy employees, 12% are owners of their own stores, 7% are in medical sales work, 5% are pharmacy managers, and 3% are in military service. The remainder are distributed in miscellaneous categories such as graduates schools, hospital pharmacy, and chemical industries.— Phi Delta Chi has awarded three graduate memberships to men in Idaho who have distinguished themselves in pharmacy. Twelve active members have also been initiated. The fraternity has continued a public relations program for the College. Programs have been presented at Twin Falls, Shoshone and Hazelton for various service organizations.— The Rho Chi Society initiated six new men at formal ceremonies in December. "Freedom of the Press" was the topic presented by the Managing Editor of the Idaho State Journal at the formal meeting.

The University of Illinois.— Dr. Joseph S. Begando has been appointed assistant professor of pharmacy administration and assistant dean of the College of Pharmacy. Formerly on the staff of the University of Kansas, Dr. Begando has his doctorate degree in economics from the University of Illinois in 1951. As assistant dean, he replaces Dr. F. T. Maher who has returned to the Mayo Foundation.— Excellent progress is being made on the new pharmacy building which is entirely enclosed and heated allowing workmen to continue the interior work through the winter. Laboratory furniture is to be delivered after the first of the year, although the new prescription desks have been received and are in temporary storage. Occupancy will start during the summer with full use slated for the fall term.— Dr. G. L. Webster has been appointed to the University Senate Committee to assist in selection of a new University president. With Dr. P. H. Simer of the anatomy department, Dr. Webster represents the Chicago Professional Colleges on the all-university committee.— Dr. Webster has been appointed to the Senate Committee on Revision of University Statutes as the representative of the Chicago Professional Colleges. The five member group is engaged in revising the statutes which govern faculty relations.— Mr. Harold Pratt, director of professional relations for Walgreen Company has been appointed to a five year term as a member of the Advisory Committee to the College of Pharmacy. Mr. Pratt, a graduate of the University of Minnesota in 1928, has been active in the local branch of the APhA as well as in the Section on Pharmaceutical Economics. He will serve until June 30, 1958.— Prof. R. E. Terry has been appointed a member of the University of Illinois Building Program Committee as well as chairman of the Building Committee for the Chicago Professional Colleges. The planning of building programs in both Chicago and on the downstate campus is a function of these committees.— Enrollment in pharmacy is announced as 394 students, with 15 of the 125 freshmen being women. A total of 1462 students are enrolled in the Chicago Professional Colleges for the fall quarter.— Mr. Dale Doerr has been appointed as instructor in phar-

macy. A graduate of Drake University, Mr. Doerr completed his Master's degree in June, 1953.

State University of Iowa.— W. W. Tesyer and H. P. Baumann, instructors in Hospital and in Manufacturing Pharmacy, visited the University of Illinois Medical Center Hospital, the Wesley Memorial Hospital, and the Passavant Hospital in Chicago in October in order to study parenteral preparations, equipment and installations.— Dean L. C. Zopf and several members of the staff attended several group meetings of the Iowa Pharmaceutical Association and the district meetings of the Iowa Interprofessional Association throughout the state during September, October and November.— Dean Emeritus W. J. Teeters was the guest speaker at a meeting of Information First on November 5. His topic was, "Chemistry and Crime."— The College was host at the November meeting of the Iowa Chapter of Sigma Xi. Prof. James W. Jones spoke on the topic, "Some Curarelike Synthetics;" Instructors James W. Conine and Seymour M. Baugh discussed "Some Considerations in the Synthesis of Lactones Related to the Cardiac Glycosides" and the "Evaluation of Antacids in Vitro" respectively.— The College sponsored a seminar for pharmacists from over the state on November 13 and 14. Inspector Ola H. Bain of the U.S. Department of Health, Education and Welfare discussed "Federal Regulations and the Pharmacist." Dr. H. F. Fraser of the U.S. Public Health Service Hospital at Lexington, Kentucky, spke on "Chronic Barbituate Intoxication." "Dermatological Preparations" was the subject discussed by Dr. Ruben Nomland, head of the department of dermatology of the College of Medicine of the State University of Iowa. "Thermometers and Syringes" was the topic presented by Eugene J. Folmer of the Becton-Dickinson Company. Ointment Bases and Suspending Agents, Laboratory Demonstrations and Prescription Problems were presented by various members of the Pharmacy staff.— Sponsored by the Iowa State Medical Society, two programs were presented over WOT-TV, Ames, on the educational background of the pharmacist, on December 4 and 11. The first program showed the first and second year college training of the pharmacist and the second continued with the third and fourth year training. The filming of the classes and laboratory work was done by Prof. John Mercer of the University's television department. The commentary for the programs was done by Dean L. C. Zopf and Dean Byrl E. Benton of Drake University. The programs were a joint effort of the State University College of Pharmacy, Drake University College of Pharmacy, and the Iowa Pharmaceutical Association.

University of Houston.— Upsilon Chapter of Kappa Epsilon was formally installed in the College of Pharmacy on December 5, 1953 by Mrs. Ruth H. Mitchell of San Antonio, Texas. Six active members and five alumni members were initiated at the service.— Mr. P. A. Williams, district supervisor of the Division of Narcotic Control spoke

recently to the Student Branch on "The Federal Narcotic Act as it Relates to the Practice of Pharmacy." The Branch is also sponsoring a series of lectures on the topic "Careers in Pharmacy."

University of Kansas.— Robert Leib, Phillip Rosenber, and Carroll Smith, first year graduate students, have been awarded University of Kansas Research Fellowships, bringing to five the total of such fellowships for the current year.— Gilbert Koff, a graduate of Temple University School of Pharmacy, and Jesse Merritt, a Kansas University graduate, have been appointed teaching assistants for the current year.— A new viewograph projector for classroom use has been added to the teaching equipment.— Dr. J. H. Burckhalter presented a paper before the American Chemical Society Meeting in Miniature recently held in Kansas City.— The Student Branch sponsored a well attended "get acquainted" Halloween picnic.— Members of the faculty have participated in panel discussions sponsored by the Kansas Pharmaceutical Association at a series of "Town Hall" meetings held throughout the state.

University of Kansas City.— Dr. E. A. Holstins has been appointed as associate professor of pharmacy. He is a native of Rhode Island and a graduate of the Rhode Island College of Pharmacy nd Allied Sciences. He received the mas'er's and doc'ora e degree from Purdue University. He served two years in the Army in Europe. Later he went to Burroughs-Wellcome in research and development. After receiving the doctorate he joined the Merck staff as a pharmaceutical chemist.— Mr. Lyle Willits, a graduate of the College, who has been on the staff on a part time basis has been appointed as assistant professor of pharmacy and plans study toward advanced degrees during summer months.— Dr. Florence Neeley of the botany department attended the Pharmacognosy Seminar in Salt Lake City in August.— Members of the faculty participated in the tenth annual seminar on November 12, which was sponsored by the alumni association.

Long Island University.— On November 15, 1953, the Alumni Association of Brooklyn College of Pharmacy tendered a testimonial dinner to Mr. Edward Neimeth, chairman of the Board of Trustees, in recognition of his long and distinguished service to the institution. The speakers on the occasion were: Admiral Richard L. Conolly, Nicholas Gesoalde, Robert P. Fischelis and Dean Hugo H. Schaefer.— Admiral Richard L. Conolly has been elected the new president of Long Island University.— Dean Hugo H. Schaefer presented the Remington Medal to Dean Hugh C. Muldoon at a dinner held in the Hotel New Yorker in New York City on December 8.

Massachusetts College of Pharmacy.— The following faculty promotions have been made: Carroll S. Gustafson, Joseph D. Matthes, and Arthur J. McBay from assistant professors to associate professors of chemistry; Raymond W. VanderWyk from assistant professor to associate professor of pharmacognosy; William E. Hassan, Jr., from

instructor to assistant professor of pharmacology and biology and consultant in hospital pharmacy; and Ronald N. Duvall from teaching fellow to assistant in chemistry.— Edward J. Brecht, vice-president and general manager of John H. Breck, Inc., has been elected a trustee of funds and Charles G. Baker a trustee of the College.— William S. Briry, upon the completion of forty years service as a trustee, during which he served as secretary of the corporation, has been elected an honorary trustee.— The expenditures of the College for the recent fiscal year were $268,901.64. Tuition and laboratory fees received from students during this period amounted to $208,440.58. The annual report shows the total assets of the College to be $3,258,186.28. The endowment funds total $1,397,414.06.— Samuel M. Best, president of the College, has been chosen as co-chairman of the local convention committee to make arrangements for the 1954 annual convention of the APhA and affiliated organizations.— The midwinter meeting of the alumni association, celebrating the founding of the College in 1823, was held on January 12. The feature of the meeting was a panel discussion on "Pharmacy's Problems Today." The members of the panel were Robert P. Fischelis, George F. Archambault, Robert E. Abrams, Irving Rubin, and Frederick D. Lascoff, moderator.— The second meeting of the Massachusetts College of Pharmacy Club of the New York, New Jersey, and Philadelphia area was held on November 7. Officers were elected and a committee appointed to prepare a tentative list of aims and objectives.

University of Michigan.— The Annual Pharmacy Lecture Series was held on October 29, 1953. The subjects and speakers were as follows: Trends in Prescriptions and Prescription Prices by David W. Stiles, Director of Market Development, Abbott Laboratories; Practical Methods for Preparing Collyria Prescriptions by Warren E. McConnell, Assistant Professor of Pharmacy, University of Michigan; Present Status of Research on Poliomyelitis by Gordon C. Brown, Associate Professor of Epidemiology, School of Public Health, University of Michigan; What Recent Court Decisions Mean to Pharmacy by Joseph H. Stainler, Counsel for the New Jersey Pharmaceutical Association and Special Deputy Attorney for the New Jersey State Board of Pharmacy; The Box Score of the Drug Store by H. W. Adkins, Executive Vice-President, Yahr-Lange, Inc., Milwaukee; and The Value of Pre-Professional Training for Pharmacy by Dr. Adam S. Bennion, Regent, University of Utah, member of quorum of Twelve Apostles, Church of the Latter Day Saints, former Vice-President, Utah Power and Light Company.— The extensive remodeling of the manufacturing pharmacy and the pharmacognosy laboratories and the purchase and installation of a number of new pieces of equipment in the former, have greatly improved the facilities of the college for these two areas of instruction. More research space for the graduate program was also provided during the process.

University of Minnesota, College of Pharmacy.— Enrollment at beginning of fall quarter was 243 students.— The following were elected to Sigma Xi Society in June, 1953: Drs. Glenn Hamor, Robert H. Miller, Wallace F. White, Blake F. Putney, and William Rost.— On November 12, personnel from the plant of Becton-Dickinson and Co. demonstrated the manufacture of clinical thermometers to the student body.— On December 8, Mr. Paul Wieseman, of the Norwich Pharmacal Company, spoke to the junior and senior classes on "Developing New Pharmaceutical Preparations."— Dr. Miller attended the International Chemical Exposition in Philadelphia on November 30.— Roland Hammer and David Herman are new teaching assistants. These appointments complete the roster of eight such positions provided in the budget.— Dr. Melvin Green, representing the ACPE, visited on the campus November 6.— Ten seniors were elected to Phi Lambda Upsilon, honorary chemical society, in November.— Harold J. Rhodes and Robert M. Leonard received Ph.D. degrees at the fall quarter commencement exercises. Dr. Rhodes is located at Duquesne University and Dr. Leonard at George Washington University.— In November, personnel representatives from Eli Lilly and Parke, Davis interviewed students for positions in the respective laboratories.

University of Nebraska.— Dr. Knud O. Moller, professor of pharmacology and director of the Pharmacological Institute of the University of Copenhagen, spoke to the faculty and students, September 30, on "Barbituric Acid Poisoning" and "General Problems of the Connective Tissues."— Recorded messages from Secretary Fischelis, President Franzoni, and Dean Tice were presented as a part of the program at the monthly meeting of the Student Branch on Founder's Day, October 7. The local branch adopted, unanimously, the resolution to form a student section within the framework of the APhA.— Mr. Victor T. Johnson, Vice-President of the Wander Company of Lincoln, has announced the establishment of three Smith-Dorsey scholarship awards amounting to a total of $480 to be granted to deserving and needy pharmacy students.— Dean Joseph B. Burt has been appointed a member of the Nebraska State Board of Health and has been named vice-chairman of the Board.— Mr. Daniel E. Moravec, instructor in hospital pharmacy, spoke before the Nebraska Hospital Association in November on the subject, "The Formulary and Hospital Drug Problems," and before the Association of Hospital Pharmacists of the Midwest on, "The Hospital Formulary and the Therapeutics Committee." Dean Burt also appeared on the same program speaking on the subject, "What an Educator Expects of Hospital Pharmacists."— The Nebraska State Medical Association's Formulary plan has been awarded first prize in the New York State Pharmaceutical Association's contest on ways and means of cutting drug costs. A first place cash award was presented to Mr. Moravec for submitting the plan.— Dr. D. M. Pace, chairman of the department of physiology, spent a month during

the summer at Jackson Memorial Laboratories, Bar Harbor, Maine, the Mount Desert Island Biological Laboratory, Salisbury Cove, Maine, and the National Cancer Institute, Bethesda, Maryland.— Instructor in physiology, Benjamin McCashland, attended the sessions of the Society of Protozoology, meeting with the American Institute of Biological Sciences at Madison, Wisconsin in September.— Leonard Nelson, now assistant professor of physiology, completed work for the doctorate at the University of Minnesota during the summer. His thesis research was on "Enzyme Distribution in Spermatozoa." He spent the latter part of the summer at the Marine Biological Laboratory at Woods Hole, Massachusetts where his work on the effects of mono and divalent ions on sperm apyrase was supported by a grant from the University of Nebraska Research Council.

University of New Mexico.— Dr. Raymond Castle presented a paper entitled, "Cinnoline Chemistry," at the annual meeting of the New Mexico Academy of Science.— "Pink Pills and Progress" is the title of a program that will feature the College of Pharmacy on KOB-TV. The program is sponsored jointly by the University and the Albuquerque Public School System. It will illustrate the progress of pharmacy has made through the ages. The pharmacy staff will participate in the program.— The Women's Auxiliary of the Albuquerque Branch of the APhA held a Smorgasbord on November 3, the proceeds of which are to be used to help needy pharmacy students.— At the December meeting of the Student Branch the Squibb "Rx" film was shown, after which Edgar Hunt gave the highlights on the fall trip of the seniors to the Lilly and the Abbott plants.— The total enrollment for the fall semester was 84. The College of Pharmacy led all other colleges on the campus by showing an 80% increase in freshman enrollment over that of 1952.— Five freshmen were recipients of Pharmacy Freshman Scholarships for the first semester.— Charles Clouthier and Edgar Lee Hunt are recipients of scholarships from the American Foundation for Pharmaceutical Education.— Dean Cataline is sponsoring a Historical Collection with the history of pharmacy in New Mexico and pharmacy in general. Forty-five items including old apparatus, books, prescriptions, and preparations have been assembled thus far.

University of North Carolina.— An All-State Pharmacy Conference of North Carolina Drug Clubs, which attracted about 100 delegates, and many other visitors, was held in Chapel Hill to disseminate information on the state-wide problems of pharmacy. The principal guest speaker was Dr. Louis Kazin, associate editor of **Drug Topics.**— Students who have been credited with the standard Red Cross first aid course manned, on a rotation basis, the first aid stations at the University's home football games.— The Student Branches of the APhA and the North Carolina Pharmaceutical Association are well co-ordinated in carrying out their many common objectives.— Pro-

fessional representatives of several manufacturers are again participating in the course of prescription specialties with lectures on their recent products.— A 35 mm. slide projector has been obtained for the course in dispensing pharmacy to show photographs of unusual, difficult, and illegible prescriptions.— Dr. Elvio Sadun of the U.S. Public Health Service addressed the graduate seminar recently on the helminthic problems he studied during a recent twenty-six month stay in Thailand.

University of Oklahoma.— The regents of the University of Oklahoma recently granted the additional title of Associate Professor of Public Health to Dr. John B. Bruce, Associate Professor of Pharmacy of the faculty of the College of Pharmacy. Dr. Bruce will teach a course in Sanitation in the Public Health department of the University.— A $2,000 industrial fellowship has been granted the College of Pharmacy for a one year study of "certain drugs useful in the treatment of urinary tract diseases." The donor is the C. B. Kendall Company, manufacturing chemists of Indianapolis. Dr. Cecil P. Headlee, assostant professor of pharmacy, will direct the research on the problem.— The Oklahoma Society of Hospital Pharmacists held its November meeting at the College. Thirty hospital pharmacists, their wives, and friends were in attendance. Prof. Jean Brown read a paper entitled "Hospital Pharmacy." In the paper Prof. Brown pointed out that a development which has had, and is having, a tremendous impact on pharmacy, and the teaching of pharmacy, is the great increase in public and private hospitals and the establishment of pharmacies in a large number of them. In discussing the problems connected with the training more and better hospital pharmacists, Miss Brown summarized the reports and recommendations which resulted from a joint study of this problem by the sub-committees on Hospital Pharmacy and Curriculum in which she participated while attending the APhA convention in Salt Lake City last summer. Prof. Blanche Sommers' class in manufacturing demonstrated the use of many pieces of equipment in the College in use in the manufacturing laboratory, which was greatly appreciated by the hospital pharmacists.— Dean Ralph Clark was the luncheon speaker for the State Science Teachers at the Oklahoma Education Association convention held in Oklahoma City on October 30. His subject was, "The Geography of Drugs." Both Dean Clark and Dr. Headlee have been requested to speak before several high school groups on the subject of "Drugs—Their Use and Misuse."— In the orientation course, new students have been discussing ethics. This portion of the course was introduced by Dr. J. Clayton Feaver, professor of philosophy of ethics and religion at the University. He was followed by a guest lecturer, Rev. W. McFerrin Stowe, pastor of St. Luke's Mehodist Church of Oklahoma City, during Religious Emphasis Week at the University. Dr. Stowe's topic was "Professional Ethics." Following a discussion of the philosophic and re-

ligious points of view on ethics, the APhA Code of Ethics was discussed in detail. A well-known pharmacist, Mr. Connie Masterson, attended the guest lectures, then addressed the students on "Professional Ethics" from the pharmasist's point of view. Students are being prepared to make ethical evaluation, as individuals, of their responsibilities and duties as pharmacists as a fundamental part of their existence in a community of persons. The objective of the course is for each student to adopt his own code of ethics based on the practice of the Golden Rule in pharmacy.— Dean Clark was on a panel on Sanitarian's Training as a part of the program at the thirteenth annual meeting of the Oklahoma Public Health Association held in Tulsa in December. He pointed out that the objective of pharmaceutical education in the University is to train the graduates professionally to be successful pharmamists; instilling in them the ethical aspects of the profession; educating pharmacy students in the area of public health, and finally to stimulate these future servants of public health to keep abreast of their ever-changing profession.— David D. Stiles of the Abbott Laboratories addressed the senior students on November 10 on the subject of "Trends in Prescriptions," and talked informally at a Rho Chi meeting. He conferred with students who are participating in the Abbott Prescription Survey which is making a three-fold contribution by getting information together so that everyone in pharmacy will be familiar with the leading prescription products of the year. This will be a guide for placing emphasis upon new products and it will give the students a fine experience in reading prescriptions.

Oregon State College.— The Ladies Auxiliary of the Oregon State Pharmaceutical Organization has given the School of Pharmacy a gift of $300 to be used to purchase special books for the pharmacy reading room.— The program for the annual midwinter seminar sponsored by the school and scheduled for January 29, will consist of talks by Dean Crossen on "A Preview of the USP XV;" by Prof. Leo Sciuchetti on Newer Therapeutic Agents"; and by Prof. Fred Grill on "New Prescription Aids."— The McKesson Training School of Merchandising for senior pharmacy students is scheduled for January 28.— The Student Branch presented three good programs during the fall term.— Dean Crossen and Prof. Grill attended the annual meeting of the Oregon State Medical Association in Portland in October. A display on "Pharmaceutical Processes" was exhibited by the School of Pharmacy at the meeting.

Philadelphia College of Pharmacy and Science.— After a lapse of ten years, the College renewed its Science Day Exhibits on December 11 and 12. Hundreds of high school students, teachers, and alumni of the College toured the laboratories to view the many exhibits.— At the Christmas Assembly on December 17, fourteen scholarships for the current year were awarded.— The factulty attended a reception dinner late in November to the four new members of the instructional

corps: Dr. C. A. Apostolids, Dr. L. W. F. Lee, Mr. Ernest H. H. Davis and Dr. William J. Erdman.— Plans are being made for the mid-winter Alumni Reunion Dinner on February 20 at which time the honored guests will be Professor Edmund H. MacLaughlin, Dr. H. C. Wood, and Dr. Karl Scholz.— Members of the faculty have been invited to participate in the second semester broadcasts over the WFIL-TV University of the Air.— Six students are participating in the panel discussions on the Four Freedoms broadcast over Philadelphia radio station WPEN.

University of Pittsburgh.— Dr. Robert J. F. Palchak, '48, who holds the B.S. in Pharm. and the M.S. from Pittsburgh, and the Ph.D. in Chemistry from the University of Cincinnati, has been named as assistant professor of pharmacy.— Mr. Samuel Coker who holds the degrees of B.S. in Pharm. from Alabama Polytechnic Institute and M.S. from Purdue, has been appointed as instructor in pharmacology.— Mr. William L. Blockstein, '50, has been appointed as instructor in pharmacy and administrative assistant to the Dean.— Mr. William Kinnard, '53, has been selected as graduate student assistant in the department of pharmacology.— Dean Edward C. Reif, in his capacity as president of the AACP was the guest of the NARD at the annual convention in Chicago in October.— Dr. Edward P. Claus was a member of the Teachers Seminar on Pharmacognosy staff in Salt Lake City in August.— Dr. John H. Wurdack presented a discussion on "Pharmaceutical Chemistry" on WCAE recently. The program was one of a regularly scheduled series sponsored by the Pittsburgh Section of the American Chemical Society.— Dr. Robert W. Sager is currently serving as chairman of the Planning Commission of Castle Shannon Borough, and president of the Rotary Club. He is also a past-president of the Parent-Teachers Association in his community.— Mr. William Blockstein was recently elected national treasurer of the Alpha Zeta Omega Pharmaceutical Fraternity.—Mr. Clarence Kelly Williamson, '48, instructor in bacteriology, spent the summer as a special teacher in the bacteriology department of the extension division of the Pennsylvania State College. His work involved teaching bacteriology to nurses in three western Pennsylvania hospitals.— Dr. Stephen Wilson, '25, became dean of the College of Pharmacy of Wayne University in September. He was formerly vice-dean of the School of Pharmacy of the University of Pittsburgh where he had given twenty-five years of continuous service.— Mr. Joseph D. McEvilla, '49, instructor in pharmacy administration, took part this summer in the first Walgreen Seminar for Teachers of Pharmacy Administration.— Dr. John H. Wurdack, '09, represented the School at the convention of the Pennsylvania Pharmaceutical Association in Atlantic City.— Mr. William L. Blockstein received the master's degree at the summer commencement of the University of Pittsburgh. His thesis, first of its kind, was on "A Public Relations Program for Retail Pharmacists."— Mr. August

G. Danti, '50, formerly instructor in pharmacy, has left his position here to continue graduate study at Ohio State University.— Mr. Richard B. Farrow, '52, graduate student assistant in pharmacy, has been selected as recipient of the George A. Kelly Memorial Scholarship Award for Teaching Fellows.— Dr. Joseph B. Bianculla, Joseph P. Buckley, Edward P. Claus and Messrs. James C. Newcomb and George B. Hook have recently given lectures before service clubs and scientific organizations in the Pittsburgh area.— Dr. Edward P. Claus has written a brief history of the Plant Science Seminar which appeared in the July 1953 number of the **American Journal of Pharmaceutical Education.** This article is a worthwhile reference article for all who are interested in this enterprising group.— Dr. John J. Wurdack, assistant curator in the New York Botanical Gardens, son of Dr. John H. Wurdack, '09, is at present on his third botanizing expedition in the wilds of Venezuela. He expects to be gone for six monhs.— For the first time, the School recently participated in the observance of the Annual Scientific Day of the Medical School Alumni Association. In addition to a panel of outstanding figures in medicine, the program included an exhibition of the many phases of medical and pharmaceutical research of today. Messrs. Blockstein and Hook were responsible for the School's exhibit on Solanaceous Drugs and Their Derivatives.— The Inter-fraternity Council of the School of Pharmacy sponsored an exhibit on "Your Pharmacist Works for Better Community Health." The display was arranged to coincide with the observance of National Pharmacy Week. The student desk of the Cathedral of Learning was the scene of the display, which pointed out the many services a pharmacist offers to the public for betterment of community living. This occasion marked the first time that student participation was responsible for a display that was made available to the students of the entire university.— Mr. Paul C. Wieseman, Chief Pharmacist in charge of New Product Development for Norwich Pharmacal Company, addressed the Student Branch on November 19. He discussed "Control of Pharmaceutical Preparations for Patients' Protection." In his talk, he developed the various steps used in product and quality control from rigid identity tests of raw materials to assay procedures for finished products and he stressed, especially, the superiority of pharmaceutifal training over chemical training for those who wish to enter the field of pharmaceutical product control.

Purdue University.— A Pharmacy Student Council has been established recently to act as a liaison group between the students of the School of Pharmacy and the faculty. Two representatives are elected by each of the three under-graduate classes, and one graduate student and two appointed members of the faculty. The Council meets monthly to discuss student-faculty problems.— Twenty-eight students taking "Hospital Pharmacy" recently made a tour in Indianapolis to

inspect the Indiana State Board of Health Laboratories, the Veterans Hospital, the La Rue Carter Mental Hospital, and the Indiana University Medical Center Hospital Pharmacy for the purpose of obtaining a first hand picture of the organization and operation of different types of pharmacies and to become acquainted with the pharmacist's role in public health.— Dr. Gustav E. Cwalina was recently promoted to rank of lieutenant colonel in the Medical Service Corps, USAR. . Dr. H. George DeKay was a guest speaker at the recent Wisconsin Pharmacists' Institute held at the University of Wisconsin. The topic he discussed was "Pharmaceutical Drug Control."— Recent guest speakers before the class in jurisprudence was J. Harold Jones, Chief of the Drug Section, and David Hartley, Chief of the Retail Food Section of the Indiana State Board of Health.— A. T. Ehrhardt, president of the Indiana Pharmaceutical Association, and Robert Gamwold, medical service representative for Abbott Laboratories spoke recently before the class in merchandising on the subject "Merchandising and Promotion of the Prescription Department."

Rutgers University.— "Open House" was held at the College of Pharmacy on December 12, 1953, between the hours of 3 to 6 P.M. The occasion was the dedication of the newly completed library, the dispensing and the pharmacology laboratories by President Lewis Webster Jones. The program also included a general inspection of the school. Student and faculty demonstrations were run continuously in the various laboratories, supplemented by intriguing displays and demonstrations throughout the building. All the demonstrations and exhibits were intended to give the public an idea of the extensive professional training to which the student of pharmacy is subjected. More than a thousand appreciative guests thronged the building during the program.— The library was the recipient, recently, of a gift of several thousand volumes of bound scientific journals and other valuable medical, biological and chemical literature donated by one of the local pharmaceutical houses.— Profs. Michael Iannarone and Pierre Smith were delegates of the New Jersey Graduate Chapter of Kappa Psi to the Grand Council convention of that fraternity in Washington, D.C., in December.

University of South Carolina.— The total registration for the fall semester was 164. Of this number 66 were freshman or transfer students. Eighteen women are now enrolled which is a record high for women in the School.— President Donald Russell has announced that a new Student Union building, to cost approximately $1,175,000, will be constructed. Specifications call for a modern type, four story, fire resistant building to be located on Melton Field. The ground floor will contain recreation and game rooms, a canteen, kitchen facilities, barber shop, beauty parlor, post office, book store and administrative offices. The main floor will provide a large lobby and lounge, checkroom, information office, and offices for the director of student activities. The rear section will house a cafeteria, two private dining rooms

and the food service director's office. On the second floor will be a lecture hall seating 550 persons with a 40 foot stage. The third floor will house offices and meeting rooms for student organizations.— At the October meeting of the Student Branch, Prof. R. C. Stokes described the program of the APhA Student Branch Conference held in Salt Lake City in August.— Prof. J. E. Hunter, Jr., and Mr. Arthur Lytle were guests of the Clinton, South Carolina Kiwanis Club on September 24. Mr. Lytle showed the University film, "A Day in the Life of a Druggist," which he produced himself.— In observance of National Pharmacy Week, Prof. D. A. Galgano and Mr. Lytle arranged two attractive displays in the Model Drug Store, and Prof. Stokes with the assistance of a number of students appeared on WCOS-TV in a panel discussion of Pharmacy.— The School has received a $60 gift from the Woman's Auxiliary of the South Carolina Pharmaceutical Association. It will be used in beautifying the student lounge or for the purchase of books.— William W. Goodrich, Esq., Assistant General Counsel of the Department of Health, Education and Welfare and Chief Attorney for the Food and Drug Administration, gave a most informative discussion of the regulations governing the manufacture and distribution of foods and drugs. The lecture was given before the entire student body of the University on November 7.— Prof. Galgano arranged an attractive display at the South Carolina State Fair. The theme was "Pharmacy and Cotton" and the display showed the many uses of cotton in pharmacy and medicine.

Southern College of Pharmacy, Inc.— Dr. Douglas Johnson presented a paper entitled "An Educator's Impression of Hospital Pharmacy" at the Southeastern Society of Hospital Pharmacists semi-annual meeting in Chattanooga, Tennessee, in October.— Dr. Oliver M. Littlejohn was guest speaker at the Covington, Georgia, Kiwanis Club held during National Pharmacy Week. The Student Branch and Phi Delta Chi observed the week by placing pharmacy displays in down town stores.— The 50th anniversary of the founding of the College was celebrated on October 17 by an evening banquet and an afternoon open house.—Dean Melvin A. Chambers represented the College at the installation exercises for Dr. Henry King Stanford as president of the Georgia State College for Women at Milledgeville, Georgia on October 30.— Members of the senior and junior classes visited the Abbott and the Upjohn Laboratories in November.— Faculty members participated in the College Week Program in November. Fourteen high schools were visited as a part of the program.— The H. Custer Naylor Library of the College has initiated a new technique in the service of communicating information to the faculty. At the beginning of the fall quarter, 1953, one full day was devoted to an Audio-Visual Workshop designed to acquaint the faculty with the equipment in the new Fred Lewis Audio-Visual collection and to give information on the selection, evaluation and utilization of audio-visual materials. The Fred Lewis Collection, a gift to the college from the

Atlanta Drug and Chemical Club, consists of an opaque projector, a filmstrip-slide projector, a microfilm reader, screens for each classroom and the necessary accessories and storage equipment. This equipment, along with other standard equipment already in the College, made possible an impressive program of audio-visual instruction. A Workshop was designed by the Library to meet two needs: the need of the faculty to operate the equipment and the need to find, evaluate and use available materials to the best advantage for the students. The morning session of the Workshop was devoted to the theme "What and Where? Selection and Evaluation of Materials." The Librarian, Mrs. Martha J. K. Zachert, introduced the Workshop and presented information to the faculty regarding specific sources for finding materials and ways of judging such materials. The faculty then previewed several filmstrips in the basic sciences. A group of about twenty-five films and filmstrips had been loaned by the Calhoun Company and by Encyclopedia Britannica Films.— During the break between morning and afternoon sessions, individual faculty members previewed other films and filmstrips from this group. The afternoon session was planned around the theme "How? Utilization of Audio-Visual Equipment and Materials." The operation of each piece of equipment was demonstrated and time was given faculty members to try their hands. Since the Audio-Visual Program is under the supervision of the Library, the Librarian explained the routine of borrowing materials, reserving equipment and keeping records of utilization. The final part of the program was a lecture and demonstration of "Effective Classroom Use of Audio-Visual Materials by Mrs. Ruby Crow, head of the Social Science department of a local secondary school, and a long-time effective user of audio-visual materials. A stimulating question and answer period followed the demonstration to the great advantage of the faculty. The Workshop was supported by the College Administration, which designated it as an official faculty meeting and allowed all faculty members time away from other pre-school duties to attend. That the Workshop was a distinct success is shown by the fact that the amount of materials used in the instructional program and the effectiveness of their use is greatly improved.

Southwestern State College.— Dean W. D. Strother attended a meeting of the Midwestern Pharmacy Conference in January at Albuquerque, New Mexico.— The chemistry department is offering a new course in the chemistry of photography, the current semester.— C. P. Mehaffy of the Globe Laboratories spoke recently before the class in Animal Health.

St. Louis College of Pharmacy and Allied Sciences.— The fall enrollment totaled 242 undergraduate and 8 graduate students. There are 53 veterans in the list.—The formal dedication ceremonies of the Gaston Frederic DeBois Laboratory of Chemistry took place on No-

vember 10.— Morris Gold, a graduate member of Rho Chapter of Alpha Zeta Omega, presented a Christmas gift to the College in the form of a $1,000 student loan fund donated by the Chapter.

University of Utah.— Dr. George E. Osborne, as faculty advisor to the local chapter accompanied three alumni, five active members and one pledge to the Western Regional Meeting of Phi Delta Chi at Rock Springs, Wyoming on November 7.— On November 7, Mr. Charles Nokes of the Squibb Company, addressed the Student Branch, discussed the value of nationally promoted goods and told how the Squibb Company carried on research in the drug field continuously and how they promoted Fair Trade.— Prof. Harry Landis Thompson, former head of the department of pharmacy (1919-1927), recently turned over to the College the remainder of his collection of slides on pharmacognosy, volatile oils, history of pharmacy, and interesting facts about the profession. It seems safe to say that the College now possesses one of the most complete collections of slides on the history of pharmacy in the country. In addition to the slides, many valuable books and papers were included in the gift.— Dr. George E. Osborne has been made a representative of Area 1, (Pharmacy and Medicine) on the Faculty Council which is the legislative body of the faculty of the entire University. Dean Hiner is an ex-officio member.— Dean Hiner recently made a trip to Seattle, Washington to attend a conference of the higher commission of the Northwest Accrediting Association formed to combine the efforts of accrediting organizations already in existence into one body.— Dr. Ewart A. Swinyard presented a seminar on anticonvulsants to the chemistry department, on December 9, in the form of a resumé of techniques and methods used in the experimental testing of anticonvulsant drugs.— A new show case for the display of pharmaceuticals has been donated by the Chicago Pharmacal Company.— The October issue of the **Bulletin of the Medical Library Association** carries two articles by Dr. George E. Osborne entitled "Faculty and Student Use of the Library" and "The History of the Committee on Libraries of the American Association of Colleges of Pharmacy." The latter paper was written in collaboration with Miss Isabelle T. Anderson, librarian of Utah's Medical Science Library.— Dr. Osborne, with the assistance of students, demonstrated the small scale manufacture of theatrical cosmetics before members of the Rocky Mountain Theater Conference on October 24 in Salt Lake City. They also built an exhibit showing the "custom" cosmetics made by the College for the University theaters.— The activities commemorating National Pharmacy Week were started on October 4 by a television program moderated by Mr. Ray Sevatius, Director of the Utah Health Council. The program was a panel discussion with Mr. Walter Boyden representing the wholesalers, Dean Hiner, the College and Dick Workman of the Student Branch. In addition, there were three radio programs pertaining to pharmacy during the week.

Temple University.— Drs. Livingston and Mann, both from the department of pharmacology, presented papers before the September meeting of the American Society of Pharmacology and Experimental Therapeutics at Yale University. Dr. Arthur E. James participated in a two weeks seminar entitled "Teaching of the Natural Sciences in Relation to Religious Concepts" held in July at the Pennsylvania State College. The Seminar was sponsored by the Danforth Foundation of which Dr. James is a Fellow.—Dr. Laquer, professor of biochemistry, addressed the Temple University Woman's Club in October on the topic "Modern Drugs" and later spoke to the Monday Club of Fox Chase on the same subject. Dr. Laquer is enrolled in a course in the "Frontiers of Knowledge" held at the Ethical Society of Philadelphia and sponsored by the Committee for Integrated Education of Philadelphia. Dr. Laquer is a member of the Executive Committee of this organization.— Dr. Fackenthal is offering a course, Mathematical Preparation for the Physical Sciences, for undergraduate and graduate students in Pharmacy. He is also giving a course in Statistical Methods of Analaysis for graduate students in pharmacy.— As a part of a new program in Industrial Pharmacy leading to the master's degree, a selected group of senior and graduate students are taking a course entitled Introduction to Manufacturing Pharmacy. The lectures deal with organization, research, production, personnel, and administrative problems of the pharmaceutical industry and are given by specialists from the various pharmacy manufacturing companies of Philadelphia.— On November 7, Prof. Leberknight of the department of bacteriology, presented a paper dealing with the history of the St. Michael Church of Germantown before the Historical Society of the Ministerium of Pennsylvania.— Prof. John Lynch of the pharmaceutical economics department recently served as a judge in a drug store window display contest sponsored by Drug Wholesalers.— Dean Joseph B. Sprowls was guest of honor at a banquet by the Montgomery County Pharmaceutical Association at the William Penn Inn on October 27. Mr. Lynch also attended the banquet representing the Philadelphia Association of Retail Druggists of which he is president.

University of Tennessee.— Dr. Karl Goldner has been appointed Dean of the School to fill the vacancy created by the death of Dean R. L. Crowe.— The Student Branch was the only Branch in the southeastern states to send two delegates to the APhA convention in Salt Lake City.— Dr. Albert H. Musick attended the Plant Science Seminar and the APhA convention in Salt Lake City as the official representative of the School of Pharmacy and the Tennessee Society of Hospital Pharmacists. Between the spring and the summer quarters, Dr. Musick visited the St. Louis College of Pharmacy and Allied Sciences and the colleges of pharmacy of Idaho State College and of the Universities of Wyoming, Washington, Minnesota, Illinois and Montana.—Fifty-four seniors, nine of them women, were granted the bachelor's degree on

December 14, 1953.— The fall quarter opened in September with approximately 50 new students.

University of Texas.— Sympathies are extended to Dr. C. O. Wilson whose father passed on November 20 in the state of Washington. Dr. Wilson, accompanied by his daughter, attended the funeral.— The second annual refresher course was held on November 12-13, with approximately fifty persons attending. The program included the following: Prescription Pricing by W. S. Apple, University of Wisconsin; Pituitary Hormones by H. E. Carver, Parke-Davis and Company; Geriatrics by J. W. Crosson, G. D. Searle and Company; Sterility in Ophthalmic Preparations by W. C. Conner, Alcon Laboratories, Fort Worth; Insufflation and Inhalation Therapy by Leo S. Duflat, Medical School, University of Texas; Prescription Trends by D. D. Stiles, Abbott Laboratories; and Panel Discussion moderated by Dean N. M. Ferguson, University of Houston.— Three students have recently received scholarship awards.— Mrs. H. M. Burlage was elected secretary of the Woman's Auxiliary of the APhA at Salt Lake City.— Dean and Mrs. Burlage attended the Southwest Texas Druggists Association in Uvalde in October.— Eli Lilly and Company has renewed its grant of $4000 to Dean Burlage to continue a study of the antibacterial properties of plant isolates.— The College has inaugurated a Pharmaceutical Extension Service with Mr. William E. Woods as director. Mr. Woods holds the B.S. in Pharm. degree as well as a law degree from the University of Texas, has had experience in several fields of pharmacy and is eminently qualified for his new appointment. He will work in close cooperation with Dean Burlage and with Dean J. R. D. Eddy of the University Extension. He will also serve as part time instructor in the College.— Kappa Epsilon held a reception in October honoring the new members of the pharmacy staff.— Kappa Psi Fraternity has the distinction of attaining the highest scholastic average of any fraternity, sorority, or other organization on the campus that maintains a house. Nine new members were initiated during the fall.— Mr. Howard Hestand addressed the Longhorn Pharmaceutical Association in November.— Prof. C. C. Albers attended the semiannual meeting of the Board of Education of the United Lutheran Church in America held in Washington, D. C., in December.— Mrs. Hazel Pipkin and Miss Sylvia Trundle, officers of the local chapter of Kappa Epsilon, installed a chapter of the sorority in the College of Pharmacy of the University of Houston on December 5.

Texas Southern University.— National Pharmacy Week observance began with a talk on Professionalism by Dr. N. M. Ferguson and closed with the annual pharmacy banquet at which Mr. Edgar J. Reed, practicing pharmacist of New Orleans, was the guest speaker.— In observance of National Diabetic Week, the Mortar and Pestle Club set up displays in the lobby on diabetic needs and foods and also sponsored a seminar at which Dr. Robert S. Raddrug, chairman of the

diabetic committee of the Harris County Medical Society, was the main speaker.— The installation of the telephone system in the dispensing laboratory and the model pharmacy has been completed and is being used by the staff and senior students.— Dean Hurd M. Jones was host at a luncheon to the Business and Professional Men's Club which met at the College at our invitation.— Thanksgiving activities included a pre-Thanksgiving dinner for the senior class given by the juniors, and a three-day open house for the benefit of the State Teachers' Association of Texas which met on the campus during November 26-28.— Mr. Ralph N. Ferguson, instructor in pharmaceutical administration has been elected vice-president of the Houston Pharmaceutical Association for the current year.— The class in dispensing is now using the recordak machine in the library to study microfilms of prescriptions obtained from local pharmacists.

University of Washington.— Prof. J. M. Bone of the University of Wyoming and Mr. Krishna Varma were granted the doctorate at the end of the fall quarter.— Mrs. Joy Plein and Prof. Ivan Rowland of the Idaho State College completed their general examinations for the doctorate during the fall quarter.— Dr. James W. Fairbairn and Dr. Hiroshi MitSukashi have been inducted into full membership in Sigma Xi. Dr. Fairbairn is visiting professor of pharmacognosy from the University of London and Dr. MitSukashi is on leave from the University of Tokyo.— Dr. Heber Youngken, Jr., spoke recently before a Medical School Seminar on Physician-Pharmacist Relations, and addressed the campus Naval Research Group on the Biosynthesis of Alkaloids in Drug Plants.— Dr. L. Wait Rising recently discussed the subject of Antibiotics before the Kings County Osteopathic Association.— Dr. Walter McCarthy gave a paper on the Synthesis of Some Cycloheptylalkylamines before the Pharmacy Subsection of the AAAS in Boston in December. Prof. T. H. Brown is the co-author.— Rho Chi initiated ten upper classmen at its November meeting. Mr. A. H. Kelley was the dinner speaker.— Dr. Louis Fischer, Grand Vice-Regent of Kappa Psi, attended the national convention in Washington, D. C., the last week in December.— Dr. E. M. Plein has been elected vice-president of the local chapter of the American Society of Hospital Pharmacists.

Washington State College.—Neil A. Zahnder was initiated into Rho Chi at its annual dinner. Following the ceremony, Dr. James McGinnis, professor of poultry science at the State College spoke on "Antibiotics in Nutrition."— Nine students were initiated into Kappa Psi Fraternity on December 11, 1953.

University of Wisconsin.— The State Board of Pharmacy, through an appropriation of $5000, has established an analytical laboratory at the School to conduct analyses necessary to the Board's work. The laboratory will operate under the immediate supervision of Drs. L. W. Busse and John Neptune, with the collaboration of two graduate

assistants.— The Army Chemical Corps has extended its contract to 1955 for pharmaceutical diffusion studies.— A Cary recording spectrophotometer, valued at $9000, has been installed for work in pharmacy.— The annual Wisconsin Pharmacists' Institute in October was devoted to the theme, "The Pharmacist, Self-Medication and the Public Health." Dr. Hugo Schaefer spoke at the Institute dinner on "A Remedy for the Misuse of Remedies." The two-and-a-half day program administered by William S. Apple was attended by 150 pharmacists.— Special citations for meritorious service were awarded by the University Board of Regents to pharmacists Max N. Lemberger and Oscar Rennebohm.— Emeritus-professor George Urdang gave the annual Edward Kremer's Memorial Lecture, presenting a biographical study of Kremers. The lecture is sponsored by Rho Chi.— Dr. Urdang has been elected honorary president of the World Union of Societies for the History of Pharmacy.— William S. Apple, coordinator of Pharmacy Extension Services, spoke on prescription pricing at the refresher course held by the University of Texas.— During the summer Dr. William O. Foye served as visiting lecturer in the University of Iowa's Chemistry Department.— Dr. August P. Lemberger joins the staff as instructor in pharmacognosy.— Dr. Glenn Sonnedecker presented a lecture on "Art and Pharmacy" at the Milwaukee Art Museum in connection with a special exhibition on "The Story of Medicine in Art."—Dr. Hans Dieckmann of Germany holds a 1953-54 post-doctoral fellowship in the history of pharmacy.— The first George Urdang Medal was awarded to Prof. Anton J. Hafliger of Switzerland at the inaugural meeting of the International Academy for the History of Pharmacy on September 17 in Paris. The presentation was made by Dr. Sonnedecker on behalf of the American Institute of the History of Pharmacy. Dr. Sonnedecker also served as chief delegate of the Institute to the World Union of Societies for the History of Pharmacy and as a delegate of the American Pharmaceutical Association to the International Pharmaceutical Federation meeting in Paris. In London he represented the School at the 90th British Pharmaceutical Conference.— Dr. Lloyd M. Parks attended a meeting at the University of Connecticul as a member of the AACP Committee on Teachers Seminar and Dr. Sonnedecker, a meeting at the University of Michigan as a member of the AACP's new Joint Committee on Pharmacy College Libraries.— Mid-year Ph.D. degrees have been granted to Roy Kuramoto, John Lach, and Arnold Marcus.

University of Wyoming.— Mr. William E. Johnson, who holds the Bachelor's degree in Pharmacy and the Master's in Science from Washington State College, has been appointed instructor in pharmacy.—Mrs. Cleota Myer is continuing as an emergency instructor in pharmacy while Prof. Ramona E. Parkinson is on leave at the Ohio State University in preparation for the doctorate.— Dean David W. O'Day and several members of the staff gave a radio broadcast

commemorating National Pharmacy Week.— Dr. Theodore O. King attended the meetings of the American Association of Pharmacologists and Experimental Therapeutics held on the Yale campus in New Haven in September.— James Scott of Casper, Wyoming, was awarded a Walgreen Scholarship for the year 1953-54.— The pharmaceutical chemistry laboratory has been newly equipped with the Hamilton all steel desks, which are supplied with hot and cold water, air, high pressure steam, vacuum liner and electric outlets.

American Pharmaceutical Association Election Results

The result of the mail ballots for officers of the APhA who will be installed at the annual convention in Boston, the week of August 22, 1954, has been announced as follows:

President-Elect Newell Stewart, of Phoenix, Arizona; practicing pharmacist and Secretary of the Arizona Board of Pharmacy and the Arizona Pharmaceutical Association.

First Vice-President-Elect John B. Heinz, of Salt Lake City, Utah; practicing pharmacist.

Second Vice-President-Elect Ronald V. Robertson, of Spokane, Washington; practicing pharmacist.

Members-Elect of the Council for a term of three years:

George D. Beal, of Pittsburgh, Pa.; Research Director, Mellon Institute.

Glenn L. Jenkins, of Lafayette, Indiana; Dean, School of Pharmacy, Purdue University.

Ernest Little, of Newark, N. J.; Rutgers University, College of Pharmacy.

The present officers of the Association who will continue to serve through the Boston convention are:

Elected by mail ballot:

President ..... F. Royce Franzoni, Washington, D. C.

First Vice-President ..... John A. MacCartney, Detroit, Michigan

Second Vice-President ..... Joseph B. Sprowls, Philadelphia, Pa.

Elected by the House of Delegates:

Honorary President ..... Eli Lilly, Indianapolis, Ind.

Secretary and General Manager .. Robert P. Fischelis, Washington, D. C.

Treasurer ..... Hugo H. Schaefer, Brooklyn, N. Y.

Miscellaneous Items of Interest

MEMORIALS

ALFRED H. OLIVE

The School of Pharmacy of Howard College together with the whole pharmaceutical profession, notes with deep regret the great loss to pharmacy on June 12, 1953, in the sudden death of Dr. Alfred H. Olive, long distinguished member of the departments of Chemistry, Physics and Pharmacy at Howard.

Born April 19th, 1877, in New Hill, North Carolina. Dr. Olive received his B.S. and Master's degree in chemistry from Wake Forest College, where he served after his graduation as an assistant in chemistry and physics. Graduate work on his doctorate degree was done at Cornell University and on completion of his studies there he served for two sessions as assistant professor of chemistry and physics.

In 1907 he came to Howard College as professor of chemistry and physics and was head of the department until 1917 when he was elected professor of chemistry at Birmingham Medical College.

While teaching at Howard and Birmingham Medical College, Dr. Olive completed requirements for degrees of Pharmaceutical Chemist and Doctor of Pharmacy at the University of Alabama.

Since 1934, he has been associate professor of pharmacy and pharmacognosy at Howard College. He is author of many published papers and one college text book. Dr. Olive was also co-author of a text book for nurses on pharmacy and chemistry.

On July 3rd 1924, Dr. Olive married Mrs. Ada Wildsmith Bagley, a widow, of Tuscaloosa County, Alabama. There were no children by this union.

Dr. Olive was honored recently by the Kappa Psi Pharmacy Fraternity at a dinner attended by more than eighty persons representing the fraternity, the faculty, officers of State and City pharmaceutical organizations, along with other invited friends. At the dinner a portrait of Dr. Olive was presented to the college which hangs in the library on the college campus.

He was a member of the American Pharmaceutical Association, the Alabama Academy of Science, a member of the Baptist Church and Past-President of the St. Clair County Farm Organization. The School of Pharmacy owes much to his labors as class advisor and advisor to the Student Branch of the American Pharmaceutical Association. Outside his college connection he was active in all pharmacy affairs.

Dr. Olive leaves his wife, Ada, a brother, Judge Hubert E. Olive, Lexington, North Carolina; and a sister, Mrs. Joseph Casey, Rocky Point, North Carolina.

Those who knew him will always remember his appealing mannerisms and radiating personality, his sincere attitude and foresight, his democratic nature and freedom from prejudice. We who knew him as a teacher, knew him to be thoroughly devoted to his profession, students and friends. His office was never closed to a student or to a pharmacist. He was a friend and counselor to everyone. Alfred H. Olive, the gentleman, the scholar, the teacher has left a record that cannot fade in the hearts of his fellow-man. His passing leaves a gap in the ranks of pharmacy that will be difficult to fill.

CHALMERS JOSEPH ZUFALL

Chalmers Joseph Zufall was born at Frankfort, Indiana on May 1, 1885 and died in the St. Elizabeth Hospital, Lafayette on December 11, 1953, following a short illness. He was one of six sons and three daughters born to Elijah I. and Mary N. (Hill) Zufall. Funeral services were held at the Rogers & Myers funeral parlors on December 14 in the afternoon with burial in Grandview Cemetery. The Masonic ritual was observed at the grave.

Education and Career

The Zufall family moved from Frankfort to Lafayette in 1887. Chalmers got his early education in the public schools here, graduating from high school in 1903. He then enrolled in Purdue and graduated from the School of Science with the Bachelor of Science degree in 1907. He taught science in the high school at Salem, Ohio from 1907 to 1913. From 1913 to 1916 he was employed as pharmacognosist for the Eli Lilly and Company, Indianapolis. During this time he was enrolled at Purdue and completed the requirements for the degree of Master of Science in 1914. He served as instructor in biology in the School of Science at Purdue University from February to June, 1916. He left this position to become professor of botany and pharmacognosy in the Philadelphia College of Pharmacy and Science, where he was privileged to be associated with Dr. Henry Kraemer and Dr. Heber W. Youngken, two of America's most distinguished pharmacognosists.

In 1917 he was appointed to the position of pharmacognosist in the Bureau of Chemistry, United States Department of Agriculture, and worked in both Washington and New York. While serving in New York he was in charge of the eastern district of the United States with respect to the enforcement of the Federal Food and Drugs Act. Dr. Zufall's work in this service was chiefly that of examining microscopically materials which were imported into the country during the First World War. It was also his duty to examine food supplies bought

by the War Department in New York and by the purchasing departments of France and Belgium during this period.

Dr. Zufall returned to Lafayette in 1921 to become instructor in materia medica, in the School of Pharmacy at Purdue. He was advanced in rank from time to time and made Professor of Materia Medica in 1939. The title was changed to that of Professor of Pharmacognosy in 1942. He held this position until his death. In the absence of the late Dean Jordan in 1926-27, Professor Zufall served as Acting Dean of the School of Pharmacy.

His area of teaching in recent years included the fields of pharmaceutical botany, pharmacognosy, and microscopy of foods, drugs, and spices. He also had charge of the medicinal plant garden which served as an adjunct to the teaching of these subjects.

During the summers of 1931 to 1936, Professor Zufall was a graduate student in the School of Pharmacy at the University of Wisconsin. He was granted a leave of absence from Purdue in 1937-1938 and continued his graduate studies at Wisconsin, receiving the degree of Doctor of Philosophy from that institution in 1938.

Marriage and Family

Professor Zufall was married to Elsie Kirkpatrick of Boswll, Indiana in September 1907. She died in January 1919. To this union three children were born, Elizabeth Louise, Joseph, and David. David died as a youth. Louise was graduated from Purdue in 1930 and now resides in Long Island, New York. Joseph served many months in the United States Army during the years of World War II. He attained the rank of Captain and was discharged a few years ago, and now lives in Winston-Salem, North Carolina.

Professor Zufall was married the second time to Miss Lucy Wiebers of Lafayette, Indiana, who, together with Louise and Joseph, survives him. The family residence has been at 617 Waldron Street, West Lafayette, Indiana since 1928.

Membership in Organizations

Professor Zufall held membership in many professional societies including the American Pharmaceutical Association, Indiana Academy of Science, New York Academy of Science, Purdue Biological Society, Sigma Xi, Rho Chi, and Kappa Psi. He was the first president of the Oakland School, Lafayette, Parent Teachers Association which was organized in 1922, and he maintained an interest in the work of that body. He was a member of the Optimist Club and its president in 1947-48. He held membership in the Central Presbyterian Church, Lafayette. He was a member of the West Lafayette Masonic Lodge No. 724 A.F. and A.M. and the York right bodies. His name appears in "Who's Who in America" and in "American Men of Science."

Dr. Zufall, for a time, was a member of the teaching staff of the St. Elizabeth Hospital School of Nursing. He also served the Lafayette Home Hospital in this same capacity for two years. He was invited, on several occasions during recent years, to lecture before the Indiana School for Police on marihuana and related subjects. He was the author of a number of published papers on technical and educational subjects. Most of these are to be found in the Journal of the American Pharmaceutical Association. A number of his shorter papers are to be found in The Purdue Pharmacist. He served as an auxiliary member of the Revision Committee of the U. S. Pharmacopoeia 1940-50.

Since 1932 Professor Zufall has served as Secretary to the 1907 Class of Purdue which has been referred to as one of the best organized and managed alumni classes of the university.

A Man of Many Interests

It is said of Professor Zufall that he aspired to be a good teacher and all reports indicate that he was. Students seemed always to feel at ease in his classes. He was interested in his students and often went out of his way to help them. He acquired many lasting friendships with students and made a special point of becoming acquainted with those from other lands. Appreciation of his efforts as a good teacher and friend has been borne out by the many letters of appreciation and sympathy that have come to his family.

Professor Zufall went through life with a serious handicap, having accidentaly lost his right arm at an early age. This did not deter him from enjoying sports such as tennis, golf, skating, hiking, and hunting. He had a collection of 17 guns and was a good marksman. He also played a good game of chess. He liked cameras and took many very interesting colored pictures as he traveled about the country. He handled a car with remarkable skill and never had an accident although he drove for years, anywhere and everywhere and for rather long distances across the country.

Professor Zufall enjoyed life, home, and friends. He was a man of stalwart character, temperate habits, and was always cordial and thoughtful of others. He was a reader of good books and kept himself generally well informed. Those of us who were associated with him for many years shall always feel indebted to him for his wise counsel and wholesome companionship.

The Faculty Committee: H. G. DeKay
C. L. Porter
Egil Ramstad
C. O. Lee

HUGH C. MULDOON

A Citation*

HUGH C. MULDOON:—

The committee of past presidents of the American Pharmaceutical Association, empowered with the responsibility of selecting the person who has made the greatest contribution to American Pharmacy during the previous year or whose contributions during a series of years have culminated to the same significant degree, selected you, Hugh C. Muldoon of Pittsburgh, Pennsylvania as 1953 Remington Medalist.

In conferring this distinction upon you the committee gives recognition to a life-time of devotion to your profession. After a teaching career at the Massachusetts College of Pharmacy, the Albany College of Pharmacy and Valparaiso University, you founded the College of Pharmacy at Duquesne University where you labored as teacher and dean for more than a quarter of a century and brought it to its present enviable position among the schools of our profession. You have inspired gatherings of pharmacists in National, State and Local Association meetings by your sound principles and effective oratory. As Chairman of the House of Delegate of the American Pharmaceutical Association, you contributed outstanding service to that organization. As President of hte American Association of Colleges of Pharmacy you gave inspired leadership to the improved program of education for pharmacists. You demonstrated your great capacity for organization, planning and accomplishment as Chairman of the Committee on the Centennial Celebration of the American Pharmaceutical Association.

As an author of texts on organic chemistry, pharmaceutical latin and other subjects, and by your sound and sane contributions to scientific and professional meetings, you have helped to enrich the literature of pharmacy. You have also brought pharmacy to the attention of scientists and teachers outside of pharmacy through your science counseling and editorship of a science publication directed to teachers and laymen.

I herewith present the 1953 Remington Medal to Hugh C. Muldoon, pharmacist, author, editor, dynamic speaker, scientist, educator, organization worker and Chairman of the Committee on Centennial Celebration.

*Made on the occasion of the presentation of the Remington Medal, December 7, 1953 by Hugo H. Schaefer

The 1954 Summer Seminar

The committee on the Teachers' Seminar on Pharmaceutical Education of the American Association of Colleges of Pharmacy held a meeting at the University of Connecticut, Storrs, Connecticut, during the latter part of November. At this time the program for the summer meeting was arranged as well as other details necessary toward staging this event.

The Sixth Annual Teachers' Seminar, financed as have been the previous five by the American Foundation for Pharmaceutical Education, will be held at Storrs, Connecticut from August 15 to 21, 1954. The program which is designed around HOW TO TEACH rather than WHAT TO TEACH, as has been the case in the past five years, is receiving favorable acceptance. Under the guidance of personable and able educational specialists the morning programs will lay the pattern for the general discussions which will be held in the afternoons. The afternoon program will be broken into the five subdivisions of our pharmaceutical curriculum under the direction of able leaders from members within our own profession.

With the excellent physical facilities afforded by the University of Connecticut and with a well-defined program, it is expected that there will be the largest attendance of any of the past seminars. The fact that Storrs is less than two hours from Boston will bring many people to our Seminar who are headed for the APhA and AACP conventions the following week.

Shortly after the first of the year the preliminary announcement of the program will be sent to the members of our Association. In the meantime the committee is most anxious that you reserve the dates of August 15 to 21 on your calendar. The members of the committee are: L. E. Blauch, L. M. Parks, A. E. Schwarting, E. A. Wilson, L. C. Zopf, H. G. Hewitt, Chairman.

The Day of the History of Pharmacy at Paris, September 17, 1953

On the occasion of the fifteenth meeting of the International Federation of Pharmacy, the two worldwide pharmaceutico-historical organizations founded in 1952, the World Union of the Pharmaceutico-Historical Societies ("Union Mondiale des sociétés d'Histoire Pharmaceutique") and the International Academy of the History of Pharmacy ("Academie Internationale d'Histoire de la Pharmacie") held their first meetings in the "Salle des Actes" of the Pharmaceutical Faculty of the University of Paris.

At 4 P. M. the delegates of the societies forming the World Union (United States of America, France, Spain, Benelux countries) and a number of interested people from other countries listened to the

addresses of the President, Dr. Bouvet (Paris), and of the Dean of the Parisian Pharmaceutical Faculty, Dr. R. Fabre, who welcomed the members of the Union in his capacity as representative of the International Federation of Pharmacy.

The reports of the General Secretary, Dr. P. H. Brans (Rotterdam), and of the Treasurer, Dr. D. A. Wittop Koning (Amsterdam), were accepted. Admitted as new members were: the "Societa Italiana di Storia della Farmacia," the "Académie Internationale d'Histoire de la Pharmacie" and the 'Société d'Histoire de Yougoslavie." A Spanish suggestion to change article V of the statutes of the Union by asking for a meeting every second year, thus synchronizing it with that of the International Federation of Pharmacy, was accepted. The assembly furthermore nominated by unanimous vote Professor G. Urdang (Madison, Wisconsin, U.S.A.) as Honorary President.

After a pleasant meal graciously offered by the French Society for the History of Pharmacy the first solemn meeting of the International Academy of the History of Pharmacy took place, attended by the officers and the members of the Academy, wearing their insignia, and many observers. There were about 250 people present representing mainly France, the U.S.A., Spain, Germany, Austria, Switzerland, Holland, Belgium, Italy, Israel, Great Britain, Sweden and Yugoslavia.

The session was presided over by the Vice-President Mr. G. E. Dann (Kronshagen-Kiel), who asked the General Secretary to read the welcoming address of the President, Professor Urdang, whose state of health prevented him from being present. The address was listened to with much interest. It was followed by the reports of the General Secretary, Dr. P. H. Brans, and the Treasurer, Dr. Wittop Koning. These reports were accepted. The Assembly agreed furthermore, with the suggested cooperation of the Academy in selecting the recipient of the "George Udang Medal," founded on the occasion of the seventieth bir hday of Professor Urdang on the thirteenth of June, 1952.

Professor Sonnedecker, Secretary of the American Institute of the History of Pharmacy, in a presentation address awarded the first "George Urdang Medal" to Professor Häfliger (Luzern), member of the Academy, in recognition of the merits of the recipient as the author of a number of important pharmaceutico-historical publications and as the founder and Director of the "Schweizerische Sammlung für Historisches Apothekenwesen" at Basel.

The session of the Academy was followed by a second session of the World Union of the Pharmaceutico-Historical Societies presided over by the President, Dr. M. Bouvet (Paris). The audience listened with much interest to the three papers devoted to the topic "What Mankind owes to Pharmacy." The first paper entitled "The Part of Pharmacy in Society" by Prof. Urdang was, in the absence of the author, presented by M. E-H. Guitard (Toulouse). The story of "The

Pharmacist Berthelot" was told by Professor Bedel (Paris), and Dr. M. Bouvet described the role played by pharmacists in the discovery of matches and tinder-boxes. Finally, Dr. Brans presented a paper on "The Pharmaceutico-Historical World Organizations," dealing with the creation and the development of the "World Union" and the "Academy," and stressing the fact that the first one limits its membership to organizations while the second one consists of selected individuals, limited in number to two for each country or autonomous territory.

The session was concluded by Dr. Bouvet, in his capacity as President of the French Society for the History of Pharmacy, by presenting the first "Parmentier Medal," created recently in honor of that illustrious and learned pharmacist, to Dr. P. H. Brans in recognition of the remarkable effort devoted by the recipient to the cause of international cooperation in the field of the history of pharmacy and especially to the creation of the International Academy of the History of Pharmacy and the World Union of the Pharmaceutico-Historical Societies.

The next day a number of the people in attendance visited with much appreciation the pharmaceutico-historical museum, guided by Mr. E. H. Guitard and Dr. Bouvet.

Through these manifestations the history of pharmacy has secured a place for itself, and the creation of an Historical Section of the International Pharmaceutical Federation opens the door for a fruitful as well as pleasant cooperation with the Federation, thus bringing the history of our profession constantly to the attention of our colleagues all over the world.—P. H. Brans, Secretary General

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Dr. James W. Fairbairn

Visiting Lecturer,

University of Washington, Seattle

Dr. James W. Fairbairn, head of the Department of Pharmacognosy of the University of London, has been appointed as visiting professor in pharmacognosy in the College of Pharmacy of the University of Washington, Seattle, for the current academic year.

Dr. Fairbairn was awarded the School Certificate with Honours, 1929, by Rutherford College, Newcastle-on-Tyne. He then attended the College of the Pharmaceutical Society, University College, and Birkbeck College and was awarded the Ph.C. Diploma in 1936; the B.Sc. (Chemistry, Botany, Physiology) 1939; and the Ph.D. (Pharmacognosy) 1946.

He has had both retail and industrial experience in pharmacy, the latter as laboratory chemist at the Imperial Chemical Industries in Billingham.

His teaching experience began as Demonstrator in Pharmacognosy, College of the Pharmaceutical Society, University of London, 1936-37; served as Junior Lecturer, Chemistry, Pharmacognosy and Pharmaceutics, Sunderland Technical College, 1937-39; Lecturer in Pharmacognosy, College of the Pharmaceutical Society, University of London, 1941-46; Senior Lecturer and Head of the Department of Pharmacognosy, School of Pharmacy, University of London, 1946-.

The scope of Dr. Fairbairn's researches is extensive and his studies are published in the standard British scientific journals.

His work in the field of quantitative microscopy under the guidance of Dr. T. E. Wallis was on Nux Vomica, and was an extension of his Lycopodium method to a problem involving linear measurements; his previous work incolved counting particles and measuring areas. Using this method they were able to analyze powders containing Nux Vomica using very small quantities of material. The work on Cardamon led to the solution of a practical problem, namely, how to distinguish several varieties of Cardamon seed when in powder form; the method was a combination of numerical determinations and histological characters. Another interesting outcome was that Dr. Fairbairn was able to show from a statistical analysis of his results that the fine commercial varieties of Elettaria cardamon could be divided up into four distinct types in a definite order. These four types and order of arrangement correspond exactly to the types and arrangement that botanists have made from a consideration of the entire plant. It was interesting to see how these differences in habit were reflected in such a minute histological character as the average cell volume of the sclerenchyma.

In the field of anatomy and histology his work (in cooperation with his colleagues) represents straight forward studies of the **anatomy** of crude drugs. He defends this phase of pharmacognostical studies by saying, "This is the sort of job, I feel, that every pharmacognosist ought to be able to do; when new vegetable drugs appear on the market our job is to supply information sufficient for the authentication of subsequent samples."

He has done research in the field of surgical dressings, on such specific subjects as absorbable haemostatics, absorbable glove powders, and rayon dressings, their uses and identification, the newer dressings and talcums which are being used in hospitals. Of these studies Dr. Fairbairn says, "There is nothing very profound in this part of my work, I feel it is also part of the pharmacognosist's job to be able to authenticate these materials."

Among Dr. Fairbairn's miscellaneous studies is his Qualitative Chemical Test for Ergot.

But Dr. Fairbairn't most extensive researches have been in the field of the Anthracine Derivatives of Purgative Drugs. When he took over Dr. Wallis' job in 1946 as Senior Lecturer and Head of the Department of Pharmacognosy, School of Pharmacy, University of London,

he says, "I realized the need of opening up in the School a new field of Pharmacognosy in view of the increasing shift in emphasis from the study of the crude drug itself to that of its constituents. I selected the anthroquinone purgatives for study of their constituents because there seemed every possibility that I could devise satisfactory chemical and pharmacological methods of assay. You will agree that these are the basic requirements for any study of the active constituents of crude drugs. I have recently written a review of my work for the **Pharm. Weekblad.** and am enclosing a copy." The review follows:

"The Active Constituents of the Vegetable Purgatives

Containing Anthracene Derivatives

"Recent work on this group of purgative drugs has drawn attention to the importance of the form in which the anthraquinones occur in the crude drug. Fairbairn **et al** [2, 4] and Lou [6, 7, 8] have devised satisfactory chemical and biological methods of assay and by applying these methods to a number of these drugs and their constituents Fairbairn[1] concluded that the anthracene derivatives are highly active as "anthranol" glycosides, less active as free anthranols and much less active as free anthraquinones. For example, work on one of the active glycosides of senna[1] showed that breaking off the sugar moiety led to a loss of about two-thirds of the activity and subsequent oxidation of the liberated "anthranol" aglycone to the anthraquinone form led to the loss of the remaining activity. The importance of the glycosidal fraction of these druge was therefore emphasized; and further work on this fraction was carried out. For senna (**Cassia** spp.), it was shown[5] that the activity of the sennosides A and B isolated by Stoll **et al** did not account for more than 40 to 60 per cent of the activity of the crude drug; furthermore, though the leaf contains less sennosides A and B than the pod, it is much more active. The activity of a third glycoside present in senna was investigated and it was shown that if the amount present represented 10 to 14 per cent of the total glycosidal fraction if exerted a synergistic effect of x 1.7. The pod contains very little of this glycoside but the leaf contains about 10-14 per cent so that its synergistic effect accounts for the greater activity of the leaf. Work on Rhubarb (**Rheum** spp.)[4] indicated that the activity was proportional to the amount of "combined rhein" present and Bellaart[9] has recently isolated from Dutch grown rhubarb an ochre-colored substance which is highly active; on hydrolysis it yields **inter alia** rhein, chrysophanol and an active resinous material. A recent American patent[10] claims to have discovered the active principle of cascara **(Rhammus purshiana)**; this is said to be a glycoside of aloe emodin anthranol having a hexital and a lactone group attached to the anthracene nucleus; my own experiments on this material however have not substantiated the claims. The galenical preparations of these drugs have been examined and it has been shown[3] that for senna, the B.P.

1948 galenicals are unsatisfactory as they only contain a small portion of the activity due to poor extraction and poor keeping qualities. We hope to publish shortly, methods for the preparation of potent and stable galenicals of senna and cascara. I have been unsuccessful in applying our biological method of assay to **Aloes** or aloin so that we have been unable tc carry out work on this drug; However recently, Latven, Sloane and Munch[11] have published a biological method of assay for aloes, which may enable a further study of this drug to be made. A review of our work on anthraquinone drugs has recently been published.[12]

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Dr. Fairbairn is known to be a tremendously enthusiastic and inspiring teacher and research worker. This spirit he transmits to both graduate and undergraduate students with whom he comes in contact. He has brought with him many fine ideas about pharmacognosy and pharmaceutical education in Great Britain. We hope that after Dr. Fairbairn has been in the United States a year he will write an article for our **Journal** giving his impressions of pharmaceutical education in our country and comparing it with the system in his own.

Dr. Fairbairn's four square conception of the potentialities of pharmacognosy and the responsibility of the pharmacognosist should be an inspiration to teachers and researcher in the field in our own country, and should furnish much food for thought for those who consider its study and service is on the decline.—Ed.

Thirtieth Annual Plant Science Seminar

The thirtieth annual Plant Science Siminar was held on the campus of the University of Utah, Salt Lake City, Utah, from August 10th through August 15th, 1953. The combined meetings of the Teachers' Seminar on Pharmacognosy and Related Subjects and the Plant Science Seminar occupied mornings and afternoons from Monday, August 10th through Friday, August 14th. During these five days presentation and discussion of some forty-odd papers there was convened a large assemblage of persons who are vitally interested in and chiefly responsible for determining the future course of instruction in pharmacognosy. Teachers in pharmacognosy and related areas of pharmaceutical education, as well as deans and administrators were afforded an unusual opportunity to exchange ideas, to present viewpoints and to learn from the accumulated experience of others. The enthusiasm and zeal that were manifest bespeak significant progress in pharmacognosy.

The objectives of the Seminar were presented by Dr. L. D. Hiner at the opening and its achievements summarized by Dr. L. F. Blauch at the close. In between the general topics of **Course Objectives** were presented by Drs. F. P. Claus, H. W. Youngken, Jr., A. E. Schwarting, W. R. Brewer, and M. W. Quimby; **Basic Prerequisites** by Drs. F. L. Mercer, S. D. Durrant, R. A. Deno, J. G. Bachtold, E. A. Swinyard, and J. E. Orr; **Teaching Methods** by Drs. S. W. Angleman, L. F. Blauch, M. Gibson, J. A. Reese, J. H. Hoch; **Methods of Presenting Specific Didactic Subject Matter** by Drs. H. W. Youngken, Sr., W. R. Brewer, F. L. Mercer; **Contribution of Laboratory Instruction to the Objectives** by Drs. C. C. Albers, J. A. Reese, Melvin Gibson, J. H. Hoch; **Special Offerings in Related and Ancillary Subjects** by Drs. H. W. Youngken, Sr., R. Pratt, J. G. Bachtold, E. P. Claus, M. W. Quimby; **Correlations of Pharmacognosy with Other Subjects** by Drs. G. E. Osborne, E. A. Swinyard, J. E. Orr; **Pharmacognosy at the Graduate Level** by Drs. W. P. Briggs, H. W. Youngken, Jr., R. Pratt, E. G. Fingl, T. J. Parmley, L. D. Hiner, R. A. Deno, A. E. Schwarting.

The E. L. Newcomb Memorial Award was presented, for the first time, to Drs. D. P. N. Tsao and H. W. Youngken, Jr. This award for meritorious work in the field of pharmacognosy honors a founder of the Plant Science Seminar, Dr. E. L. Newcomb. It was fittingly presented by Dr. H. W. Youngken, Sr., another charter member of the Seminar.

"Gathering Books and Herbs for the Saints" was the subject of a most interesting talk by Dr. L. H. Kirkpatrick, University of Utah, librarian and historian. Dr. R. W. VanderWyk presented the results of a questionnaire-survey on teaching of pharmacognosy in American schools and colleges of pharmacy.

At the first business session of the Plant Science Seminar on Monday night, August 10th, Chairman Carl H. Johnson suggested that a plan for presenting annual surveys of significant progress in pharm-

acognosy be inauugrated by the Plant Science Seminar. Committee appointments were made and Dr. L. D. Hiner, local chairman, extended a cordial welcome to the assembled Seminarians.

On Wednesday night the annual watermelon party was held on the Union Building lawn where a nice view of the encircling mountains was enjoyed. The annual dinner was held at the home of Dr. and Mrs. Reed S. Clegg on the mountainside overlooking Salt Lake City and valley. This beautiful spot was graciously opened to the combined group for the afternoon and evening and pre-supper swimming was enjoyed by some Seminarians. Dr. W. P. Cottam, Prof. of Botany at the University of Utah, entertained the group with a talk, "When Deserts Bloom," built around his extraordinary collection of colored slides of plant life. The flora in various desert areas was strikingly illustrated and explained.

On Saturday morning, August 15th a motorcade formed for a field trip to the Brighton area. Stops along the way to point out features of interest included brief talks by Dr. L. H. Creer on the history of the old Mormon Trail, by Dr. A. Eardley on the geology and by Prof. I. B. McNulty on the flora of the region. The very scenic trip ended at the Alpine Rose Lodge adjacent to the ski lift at the head of Brighton Canyon. After a box lunch most of the Seminarians boarded the ski lift for a thrilling ride to Summit. Some walked back down the trails, botanizing on the way, and all descended to Maxfield Lodge by late afternoon. The Executive Committee of the AACP joined the group for dinner which was served in a clearing adjacent to the Lodge.

The final business session of the Seminar was held after returning from the field trip. The secretary-treasurer's report showed a balance of $112.45 on August 8, 1953. Registration was larger than at any previous meeting. The names of 157 persons represented 58 schools and colleges of pharmacy in the U. S., 4 Canadian and 2 trans-Atlantic institutions. The Resolutions Committee expressed thanks to the many individuals who had contributed their time, effort and money to making the 1953 Seminar a success. The incoming chairman was empowered to carry out the plan of a literature review of current research in pharmacognosy. Time and place for holding the 1954 meeting was left to the Executive Committee.

The Nominating Committee report was adopted and resulted in the election of the following officers for 1953-54:

Chairman—L. D. Hiner, University of Utah, Salt Lake City, Utah.

First Vice Chairman—J. R. Anderson, Parke, Davis Co., Detroit, Michigan.

Second Vice Chairman—R. W. VanderWyk, Massachusetts College of Pharmacy, Boston, Mass.

Secretary-Treasurer—J. H. Hoch, Medical College of South Carolina, Charleston, S. C.

The Executive Committee consists of the two immediate past chairmen, Drs. J. C. Munch and C. H. Johnson, the Chairman, Dr. L. D. Hiner and the Secretary-Treasurer, Dr. J. H. Hoch.

As presiding officer, Dr. R. W. VanderWyk adjourned the 1953 Plant Science Seminar.—J. H. Hoch, Secretary.

The Veterans Administration Information Service has announced the resignation of E. Burns Geiger, Director of the Veterans Administration Pharmacy Service for the last six years, effective January 16, 1954, to accept a position in private industry. He assisted in organizing and has supervised VA's present pharmacy program covering all VA hospitals and clinics and about 30,000 private pharmaceutical and drug business concerns. He was commissioned an ensign in the U.S. Navy Reserve in 1942 and was assigned to active duty January 2, 1943. He served afloat and ashore until December 1945 when he was separated as a lieutenant. He presently holds a reserve commission in the Medical Service Corps, USNR. Mr. Geiger joined VA in May 1946, assisting W. Paul Briggs, the first director of Pharmacy Service, in establishing and developing the pharmacy program. He was appointed director in January 1948 when Mr. Briggs resigned, and has served in that capacity to date.

Mr. Geiger will be succeeded by Vernon O. Trygstad who has been his principal assistant for the last 26 months in the direction and administration of the pharmacy program. He received the B.S. in Pharm. degree from the North Dakota State College in 1936. He was engaged in retail pharmacy until 1940 when he was appointed a narcotic agent in the Federal Bureau of Narcotics, assigned to duty in New York City and later in Washington, D. C. He was commissioned an ensign in the U.S. Naval Reserve and served on active duty in the Pacific during World War II as a line officer on an invasion ship. He was released to inactive duty in 1946 with the rank of lieutenant (JG) and has been transferred to the Medical Service Corps. After a brief return to the Bureau of Narcotics, Mr. Trygstad was appointed chief of the pharmacy section of the former VA branch office in St. Paul, Minnesota. When the VA branch offices were abolished in 1949 he was transferred to the pharmacy division in VA's Central Office at Washington, as chief of the pharmacy operations section. In 1951, he was made assistant chief of the pharmacy division. He holds active memberships in the American Society of Hospital Pharmacists, the American Pharmaceutical Association, the International Pharmaceutical Association and the North Dakota and the Minnesota State Pharmaceutical Associations, and the Rho Chi Society. He is registered in North Dakota, Minnesota, West Virginia, and Maryland.

New Books

Pharmaceutical Preparations by George E. Crossen, Ph.D., Dean and Professor of Pharmacy, School of Pharmacy, Oregon State College, and Karl J. Goldner, Ph.D., Professor of Pharmacy, School of Pharmacy, University of Tennessee. 1952. Third Edition, Thoroughly Revised. 265 pp. Lea & Febiger. Price $4.

The text presupposes the student has had sufficient training in chemistry and the fundamental laboratory technics so he is in a position to take up a detailed study of the manufacture of the official pharmaceutical preparations with some understanding. He should be informed also of any precautionary measures that should be observed in their handling, storage and use. The book has been brought into harmony with the latest editions of the USP and the NF and is to be used in connection with the study of these standards. For that reason repetition of any portion of the standards has been avoided. Because a section on sterilization was not admitted to the USP XIV, a chapter on that subject was added to the present edition as a fourth appendix. The text shows the effect of the years experience of the authors as outstanding teachers.—R.A.L.

A Text Book of Inorganic Pharmaceutical Chemistry by Charles H. Rogers, Sc.D. (Hon. Univ. Mich.), Dean of the College of Pharmacy and Professor of Pharmaceutical Chemistry, University of Minnesota; Taito O. Soine, Ph.D., Professor of Pharmaceutical Chemistry, University of Minnesota; and Charles O. Wilson, Ph.D., Professor of Pharmaceutical Chemistry and Chairman of Department, University of Texas. 1952. Fifth Edition, Thoroughly Revised, 850 pp. with 22 illustrations. Lea and Febiger. Price $10.

The authorship, the extensive use of the text, and the fact that it has reached the fifth edition through the years of its publication, are all factors that speak of the excellency of the book. It has been revised so that it can be used to advantage in connection with the latest editions of the USP and the NF by students and practitioners of pharmacy. The experience of the authors has led them to reintroduce the quantitative determination of the compounds but to restrict the discussions to brief explanations of the principles and reactions involved in the assays. Obsolete commercial methods for the preparation of certain compounds have been deleted and this phase of the work has been modernized as far as possible. The consideration of the organo-metallic compounds have been dropped except in cases where they seem to belong traditionally to inorganic pharmaceutical chemistry. Users of the book are referred to texts on organic pharmaceutical chemistry for information concerning strictly organic substances. The pharmacology on uses of the compounds has been revised in accordance with the latest views. Much valuable material has been added to the Appendix for the convenience of the reader.—R.A.L.

Quantitative Pharmaceutical Chemistry by Glenn L. Jenkins, Ph.D., Professor of Pharmaceutical Chemistry and Dean of the School of Pharmacy, Purdue University, and John E. Christian, Ph.D., Professor of Pharmaceutical Chemistry also at Purdue, and George P. Hager, Ph.D., Professor of Pharmaceutical Chemistry, School of Pharmacy, University of Maryland. 1953. Fourth Edition. 534 pp. 57 illustration. McGraw-Hill Book Company, Inc. Price $6.50.

Previous editions of this book were co-authored by Dean Jenkins and the late Dean A. G. DuMez of the University of Maryland. The addition of the new co-authors guarantees the continued excellence of the text which has found a wide field of usefulness. As the authors state, the book is intended to be used both as a text and laboratory manual and has as its objective the furnishing of a systematic course covering the quantitative physical and chemical methods of the latest editions of the USP and NF, the classifying of the official procedures according to type methods of analysis for effective instruction, and the presenting of some of the non-official methods which are used in pharmacy of which the student should have some knowledge. All phases of the text have been thoroughly revised to conform to the official compendia: new illustrations and new material relative to instrumental methods have been introduced. Each chapter is followed by a list of questions and problems intended to fix the principles discussed in the student's mind, and in some instances a brief list of references is appended.—R.A.L.

Pharmacognosy Laboratory Manual by Maynard W. Quimby, Ph.D., Raymond W. VanderWyk, Ph.D., and William E. Hassan, Jr., Ph.D., all of the Division of Pharmacognosy and Allied Sciences, Department of Biological Sciences, Massachusetts College of Pharmacy. 1953. 108 pp. printed on high quality heavy paper and blank pages for personal records, with spiral binding so pages will lie flat when open. Burgess Publishing Co., Minneapolis. Price $3.00.

The introductory pages of the manual give information of value to both instructor and student and include a list of selected references, a list of the names and addresses of some pharmaceutical manufacturers, a list of locker and laboratory equipment, and a list of laboratory suggestions primarily for the guidanee of the student. The body of the manual is divided into three sections. Section I describes several micromechanical methods commonly used in isolating and identifying the active constituents of drugs of biological origin. Section II is devoted to a study of harmful plants such as those which produce skin irritation or are toxic when taken internally or those that are allergenic. Pollen study technics are stressed. Section III covers drug and economic products of animal and plant origin which are official in the USP and NF or which yield official constituents. In this study the taxonomic system is employed.

It is refreshing and stimulating to see the effort that young men in the disciplines of "modern pharmacognosy" and in pharmacology are making in the writing of laboratory manuals that publishers are willing to print in a dignified and more permanent form. The publication of laboratory manuals in these fields have always been an expense to the publisher and many high class companies have refused to print them because of their ephemeral nature and their limited uses. This is because instructors in these fields have written laboratory guides "to fit the equipment of their own laboratories instead of building their laboratory equipment to best present the basic matter of their disciplines. It is just as impossible to write a laboratory manual which will be completely satisfactory to every instructor as it is impossible to write a textbook and present the subject matter in such a way as to satisfy every teacher. It would be tragic if this could be done for it would put an end to experimentation and effort and progress. But if a laboratory manual can be written so that a definite pattern emerged that may be modified in the light of new experience and knowledge, then real progress has been made. To the writer, the authors of the present manual seem to have made a real contribution toward that objective.—R.A.L.

Oral Histology and Embryology, by 15 outstanding Teachers and Researchers in their respective fields and Edited by Balint Orban, Loyola University School of Dentistry, Chicago. 1953. Third Edition. 364 pp. 263 text illustrations including 4 color plates. The C. V. Mosby Company. Price $8.50

The text is intended primarily, of course, for the undergraduate and the graduate dental student and for the dental practitioner. It is written with great clarity and the illustrations are most exceptional. As a matter of fact it is written in such an understanding style that even an intelligent layman who is interested in the structure and development of his teeth and the other structures related to his own mouth will find the reading of the textual material interesting and profitable, although his background in biology may be very meager. As collateral reading for the pharmacy student and the practicing pharmacist who has an ambition to cooperate with the dentist, a text of this type is most valuable in helping him to intelligently practice his profession as it is related to the dental area. A list of references follows each chapter which directs the student or practitioner to source material.—R.A.L.

The Pharmacist in Retail Distribution, by A. Hamilton Chute, Ph.D., Professor of Retailing and Retailing Specialist in the Bureau of Business Research, College of Business Administration, University of Texas, and Mrs. Esther J. W. Hall, M. S. in Pharmacy, Assistant Professor of Pharmaceutical Administration, College of Pharmacy, University of Texas, Austin, Texas. 356 pages 8½x11 mimeoprint with photo-offset illustrations. A spiral binding holds the loose-leaf

pages and illustrated cardboard cover. 1953. Hemphill's, Austin, Texas.

The book has been written as a text, presenting the theoretical and practical aspects of retail distribution for students who plan to enter the field of retail distribution after completing the requirements for the Bachelor Science degree in pharmacy; and also for the use of retail pharmacists who are interested in modern merchandising methods as applied to the profession of pharmacy.

The title of the 1953 edition is slightly different from that of 1941, which was entitled **Retailing by Pharmacists.** However, the text, to a great extent, follows the general outline and method of presentation of the previous edition, modified somewhat to conform to the outline recommended in **The Pharmaceutical Curriculum** as published in 1952 by the American Council on Education.

The 1941 edition had thirteen chapters, whereas the 1953 edition has twenty-six chapters, some of them new, others representing divisions and revisions of the chapters of the former edition. The first two chapters deal with the operations of the pharmacist in general marketing activities and his position among retail institutions. The other twenty-four chapters deal with locating, acquiring, financing and organization of a pharmacy; layout, fixtures and equipment; purchasing merchandise, receiving, marketing and pricing; budgeting and stock control; operating costs; sales promotion and especially the promotional opportunity in the prescription department; personal selling and services; risks and insurance; public relations; and general business policies.

The material for the book has been gathered from many sources, including governmental publications; reports of special studies by universities and manufacturers, such as the **Lilly Digest;** and articles from drug trade journals and textbooks. The book includes three figures illustrating floor plans, ten plates showing modernization of the interior of pharmacies, the outer cover also being a montage of store interiors. There is some repetition and redundancy in the compilation of the text, but repetition is often an advantage rather than a detriment to the student.

In his reviewer's opinion the authors have presented an interesting book from a mass of available material, in which they describe the policies and methods desirable in a retail pharmacy, a portion of the contents being new, the balance representing the material of the first edition. The work of this text will greatly reduce the work of both teacher and student in garnering and appropriating the material from the original sources. The book also furnishes important facts, policies, methods, etc. for easy implementation and adoption by the pharmacist in his daily retail practices.—B. Olive Cole.

K.M.C. Zevenboom and Dr. D. A. Wittop Koning
Nederlandse Gewichten
Stelsels, Ijkwezen, Vormen
Makers En Merken
(Dutch weights, systems, gauging, forms, manufacturers and marks).
Rijksmuseum voor de Geschiedenis der Natuurwetenschappen to Leiden 1953. 263 pages.

This book has been issued on the occasion of the 40th birthday of the Dutch Society for the History of Medicine, Mathematics and Natural Sciences and it is a wonderful present indeed.

As the director of the "Rijksmuseum," Miss Maria Rooseboom points out, there is so much material in the museum or in other places illustrating the development of the Dutch weights and everything that belongs to it, that it was waiting for somebody to make use of it for a historical presentation. The question was to find authors knowing the whole field, the technical as well as the cultural part of it. Fortunately this question could be answered in the most favorable way through the cooperation of the best experts available: Mr. K. M. C. Xevenboom, gauger in the service of the gauging office at Zwolle, and Dr. D. A. Wittop Koning, apothecary in Amsterdam.

Although the title of the book limits its contents to Holland, we have not to forget that this little country has been for centuries one of the most important European emporiums for cultural goods as well as for commercial ones. Hence we find again and again information that can be applied to the worldwide development in the field concerned. From this point of view it seems to be natural that the book starts with a report on Roman and French Weights which have been found in Holland, and offers a brief but excellent story on the use of the troy weight in Holland. A number of tables and reproductions of weights help the understanding and an excellent bibliography makes it possible for everyone to look up the literature on topics in which he may be especially interested.

The book has been written in Dutch. But with a good dictionary and using the above mentioned tables and reproductions, it should not be too difficult for people without knowledge of the Dutch language to use it.—George Urdang, University of Wisconsin.

Dr. D. A. Wittop Koning: Nederlandse Vijels (Dutch mortars). 1953 Uitgeverij "Dave" To Deventer.

Some years ago, in the middle of the terrors of the second world war, this writer expressed the fear, that the mass destruction of our cultural heritage in Europe would for quite a while make the United States of America the only guardian of cultural work in pharmacy as well as in other fields.

At that time the Dutch apothecary Dr. D. A. Wittop Koning protested, at least for his country. Fortunately he has been right and it

is to a very great extent due to him that remarkable contributions to the History of Pharmacy in all its ramifications have come from Holland.

His excellent book on 'Art and Pharmacy," published two years ago, has been followed now by a book on Dutch mortars which likewise is as informatory as it is beautiful. Nobody who is at all interested in the humanistic aspects of pharmacy can be without this newest contribution of Dr. Wittop Koning. The book has been written in Dutch, but since at the end of it there are summaries in English, French and German, and the illustrations are speaking for themselves, we are sure that, to quote from the author, the book "will enable even those who have no knowledge of the language to identify Dutch mortars."

Furthermore it is good news that for 1954 the author is promising a similar book on Delft pharmaceutical pottery.—George Urdang, University of Wisconsin.

Current Organization and Activities of the Botanical Section, Subsections, Commissions, and Committees of the International Union of Biological Sciences is described in an eight page folder which has been prepared and is being distributed from the Secretary's office, Chronica Botanica House, Waltham 54, Massachusetts, U.S.A. The folder is most informative, giving the scope of botanical activities and should be in the hands of all interested in botanical studies the world around.

Of special interest to the historically minded is the International Biohistorical Commission (Biohistorical Subsection) (Secretary: Dr. F. Verdoorn, Waltham, Mass.) at present being organized according to the plans made during the Stockholm meetings of the Botanical Sections. It will continue the program of the former International Plant Science Relations and Phytohistorical Commission but on a wider basis. It should be emphasized that *the Commission is mainly interested in projects which have a direct bearing on current work in the biological sciences and that it is not primarily concerned with biological history as a branch of, or for the sake of, the history of science.* Its program is being developed, in consultation with the International Union for the History of Science, to avoid overlapping the field covered by that union. Hitherto, there existed at least a hundred organizations for the history of medicine, several for the history of agricultural economics, chemistry, pharmacy, etc., but not a single one for the history of biology and related fields, as outlined in detail in the Secretary's essay, "Remarks on the Need for Institutions for Certain Branches of the History of Science" (Am. Jour. Phar. Educ. 15:338/348, 1951). The folder is obtainable by addressing the Secretary, Dr. F. Verdoorn, Waltham 54, Massachusetts.—Ed.

INSTITUTIONS HOLDING MEMBERSHIP IN THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

New Mexico
University of New Mexico, College of Pharmacy, Albuquerque. (1958)
E. L. Catalina, Dean

New York
University of Buffalo, School of Pharmacy, Buffalo. (1939)
A. R. Leeuw, Dean
Columbia University, College of Pharmacy of the City of New York. (1939)
E. E. Lesallier, Dean
Fordham University, College of Pharmacy, New York. (1939)
James H. Kidder, Dean
Long Island University, Brooklyn College of Pharmacy, Brooklyn. (1939)
Hugo H. Shaefer, Dean
St. John's University, College of Pharmacy, Brooklyn. (1951)
John L. Dandreau, Dean
Union University, Albany College of Pharmacy, Albany. (1946)
Francis J. O'Brien, Dean

North Carolina
University of North Carolina, School of Pharmacy, Chapel Hill. (1917)
E. A. Brecht, Dean

North Dakota
North Dakota Agricultural College, School of Pharmacy, Fargo. (1922)
W. F. Sudro, Dean

Ohio
Ohio Northern University, College of Pharmacy, Ada. (1925)
Albert C. Smith, Dean
University of Cincinnati, Cincinnati College of Pharmacy. (1947)
J. F. Kowalewski, Dean
Ohio State University, College of Pharmacy, Columbus. (1909)
B. V. Christensen, Dean
University of Toledo, College of Pharmacy, Toledo. (1941)
Charles H. Larwood, Dean

Oklahoma
Southwestern State College, School of Pharmacy, Weatherford. (1951)
W. D. Strother, Dean
University of Oklahoma, College of Pharmacy, Norman. (1905)
Ralph W. Clark, Dean

Oregon
Oregon State College, School of Pharmacy, Corvallis. (1915)
George E. Crossen, Dean

Pennsylvania
Duquesne University, School of Pharmacy, Pittsburgh. (1927)
Hugh C. Muldoon, Dean
Philadelphia College of Pharmacy and Science, Philadelphia. (1909)
Ivor Griffith, Dean
Temple University, School of Pharmacy, Philadelphia. (1928)
Joseph B. Sprowls, Dean
University of Pittsburgh, School of Pharmacy, Pittsburgh. (1909)
Edward C. Reif, Dean

Philippines
University of the Philippines, College of Pharmacy, Quezon City. (1917)
Petrocinio Valenzuela, Dean

Puerto Rico
University of Puerto Rico, College of Pharmacy, Rio Piedras. (1926)
Luis Torres-Diaz, Dean

Rhode Island
Rhode Island College of Pharmacy and Allied Sciences, Providence. (1926)
W. Henry Rivard, Dean

South Carolina
Medical College of South Carolina, Charleston. (1949)
William A. Frost, Dean
University of South Carolina, School of Pharmacy, Columbia. (1925)
Robert W. Morrison, Dean

South Dakota
South Dakota State College, Division of Pharmacy, Brookings. (1908)
Floyd J. LeBlanc, Dean

Tennessee
University of Tennessee, School of Pharmacy, Memphis. (1914)
Karl J. Goldner, Dean

Texas
Texas Southern University, School of Pharmacy, Houston. (1953)
Hard M. Jones, Dean
University of Houston, College of Pharmacy, Houston. (1959)
N. M. Ferguson, Dean
University of Texas, College of Pharmacy, Austin. (1916)
Henry M. Burlage, Dean

Utah
University of Utah, College of Pharmacy, Salt Lake City. (1951)
L. David Hiner, Dean

Virginia
Medical College of Virginia, School of Pharmacy, Richmond. (1909)
R. B. Smith, Dean

Washington
State College of Washington, School of Pharmacy, Pullman. (1913)
Hsaikee Hang, Dean
University of Washington, College of Pharmacy, Seattle. (1908)
Forest J. Goodrich, Dean

West Virginia
West Virginia University, College of Pharmacy, Morgantown. (1920)
J. Lester Hayman, Dean

Wisconsin
University of Wisconsin, School of Pharmacy, Madison. (1900)
Arthur H. Uhl, Dean

Wyoming
University of Wyoming, College of Pharmacy, Laramie. (1951)
David W. O'Day, Dean

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